MODEL AIRPLANE NEWS

NOVEMBER 1947 • 25 CENTS

sh! First Photos & Story of the '47 Nationals! .. Pg. 9

Sopwith Triplane Controliner .. Pg. 16

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MODEL AIRPLANE NEWS

JAY P. CLEVELAND
Publisher

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NOVEMBER 1947 VOL. XXXVII No. 5

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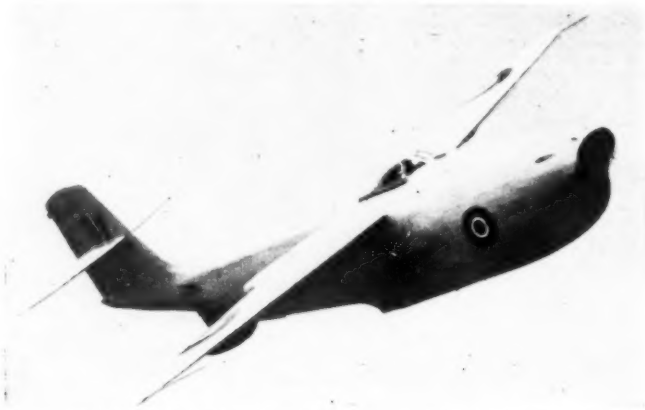
RECORD BREAKING Douglas D-558 is undergoing engine change from TG-180 engine, of 4000 lbs. static thrust, to TG-190 with 5000 lbs. normal and 6000 lbs. with water injection. This 50% increase in thrust should drive the tiny red speedster deeper into the transonic zone. Best estimate in official circles is that it should make 675 mph before encountering really severe compressibility difficulties. An interesting sidelight on the new 640.7 mph record is that this is still "slower," technically speaking, than the Gloster *Meteor* mark of 616 mph. The *Meteor* speed, in terms of Mach number, was 0.83 whereas the D-558 on its record breaking flights, hit only 0.824 and the Lockheed P-80R accomplished only 0.798 in its record-smashing attempt. Secret of the Mach number figure is temperature; the higher the temperature the higher the speed of sound. Since all racers can reach only a certain Mach number, the hotter the day the faster their speed in miles per hour, the actual Mach number of the speed staying the same. Most observers feel that if the British follow through on their idea of taking the *Meteor* to the African desert, the record will zoom out of American reach. Keep in mind however that the *Meteor* has *two* jet engines which produce nearly 10,000 lbs. of thrust total, compared to the 4-6,000 lbs. of current American designs.

NEW DOUGLAS DC-9 has everyone completely puzzled, since the craft is a conventional design without outstanding performance, accommodations or unusual features. While such a design has many uses, and had the plane been in quantity production two years ago successful sales would have been assured, few can rationalize Douglas' current announcement of the design. A low-wing, twin engine craft seating 28 passengers, cruising at 242 mph and powered by

(*Turn to page* 73)



Saunders-Roe jet fighter (above) passed tests successfully; was found to provide very rapid takeoff and speeds well over 400 mph. (Below) This tiny all metal glider, contrasted with a huge DC6, was built from a P-38 drop tank by Irving Prue.

POLK'S

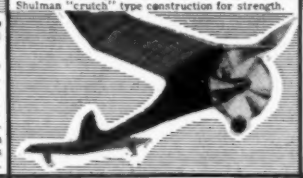
INVITES YOU TO VISIT OUR HOBBY SHOWROOMS
IT'S A YEAR ROUND HOBBY FAIR AND EXHIBIT!

See our permanent exhibits of built-up models in Chicago and New York. You'll always find the latch string out at Polk's two big showrooms. It's a fascinating, year 'round display that will keep you busy looking for hours. If it's a model item you'll find it at Polk's. Come in and get acquainted.

ZOOMER!

CLASS A, $3.50 CLASS B & C, $6.95

Lt. Leon Shulman really opened his bag of construction tricks with the popular, high-flying, contest-winning "Zoomer". Sensational high rate of climb, slow sinking speed. Light, graceful, easy-to-build, works equally well with gas or diesel engines. Has won numerous meets this season and can put you in the championship class, too. Features the famous Shulman "crutch" type construction for strength.



MITE-BEE - $4.95

America's most versitile control line model, the 5-in-1 job that uses either Class A or B engines. The saucy, fast-stepping "Mite-Bee" can be constructed 5 different ways: Straight hi-wing racer, Gull wing stunt biplane. Lo-wing speedster, Straight wing bipe. Gull wing sport monoplane. Wingspan, 24" length, 20". Three dimensional plan features 5 different 3-view drawings plus photos of each type and many detailed construction views.

Nieuport 17C.1

One of the famous "Fighting Five" World War I pursuit jobs which has been modeled in scale in a new, easily-built, practically self-flying control line model. Watch this beauty as she flashes by & you will know why so many are taking to the air. Wingspan, 27" length, 17½". One of France's best known fighters, engineered to fidelity scale. Kit contains all necessary materials and highly detailed plan with separate instructions.

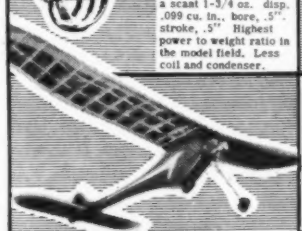
NIEUPORT 17C.1 Kit - - - - - - - - - - - - - $3.50

MERLIN - $6.95

Here's the proven, dependable Merlin "Super B" engine with coil and condenser at a never-before-equalled price. Formerly, $21.50, now available while quantities last at less than 1/3rd that price. Specifications: Bore, 11/16" displacement .232 cu. in., bare weight, 5½ oz. All moving parts mirror-finished for longest life. Tungsten and platinum points for trouble-free operation. One of the exceptional values of all time - send order now.

ATOM Engine $15.50

"King of the Small A's" is the minute, but mighty Atom, still unsurpassed for contest or sport flying-either free flight or control line. Weighs a scant 1-3/4 oz. disp. .099 cu. in., bore, .5", stroke, .5". Highest power to weight ratio in the model field. Less coil and condenser.



FOKKER D8

Sleek, high-wing monoplane fighter of World War I - a natural for control line stunt and precision flying. Known as the "Flying Razor", this very maneuverable ship was noted for its ability to make tight circles and loops. The same characteristics apply to this fidelity scale model. Wingspan, 26", length, 18". Kit contains all necessary materials & a "super" plan with detailed building instructions. A beauty of a model from a beauty of a kit.

FOKKER D VIII - - - - - - - - - - - - - - - - $3.50

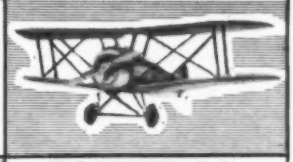
Sopwith Camel

England's renowned pursuit plane of the first World War, a specially fine performer on the end of your control lines. With a 26" wingspan and a fuselage length of 18", the "Camel" is perfectly proportioned to turn in winning flights every time. You'll find this an easy model to build and fly, working from the super detailed plans and selected materials provided in the kit. Simplified construction makes building this ship a pleasure.

SOPWITH CAMEL Kit - - - - - - - - - - - - - $3.50

BUNNY - $1.25

For the economy-minded modeler, the Bunny "Plan Kit" is the ideal way to build control line models. The "Bunny" is a 19" wingspan, 17½" fuselage job and comes with a big 35" x 45" highly detailed plan, plus all printed balsa sheets and firewall. You make up remaining bill of materials from supplies already on hand. In this way, you get an extremely good model at a very low cost. And by being able to select the other materials, you do a better job, turn out a stronger model.



MOVO DIESEL

The best of the Continental and English diesels - top place winner in numerous foreign contests. By far the best compression-ignition engine available on the American market because of its easy-set adjustable compression head. Requires no ignition system, weighs only 5 oz. Displacement, 0.125 cu. in. Easy to start; smooth running. Quantities limited so order promptly. $21.50 each.

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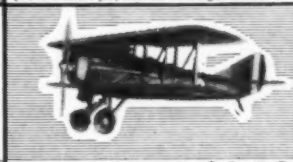


FOKKER D7

One of Anthony Fokker's most famous airplanes and one of the first planes with cantilever wings. A particularly easy ship to build because of its square sided fuselage and even chord wings. Yet completed, it makes a very graceful flyer which will turn in consistent flights for precision and stunt events. Kit for 28" span job (fuselage length is 22") is complete and contains detailed, illustrated plans, building and flying instructions.

FOKKER D7 Kit - - - - - - - - - - - - - - - $3.50

WESTERNER

From out of the West comes this magnificent performer which is winning meet after meet. Available in 3 classes to fit every motor. Complete with 2 big instruction books by designer and champ flyer, Don Foote, peer of the west coast free flight experts and nationally known competition winner.

CLASS A Kit - 50" span - - - - - - - - - - $3.50
CLASS B Kit - 61" span - - - - - - - - - - $4.50
CLASS C Kit - 86" span - - - - - - - - - - $5.95

SPAD 13C.1-$3.50

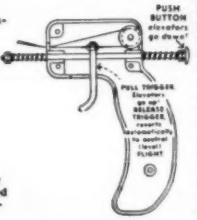
One of the most famous aircraft of all time - acclaimed in story and song - now available for the first time as a control model in complete kit form. It's a big 26" wingspan, 20" length model capable of speedy flights and especially adaptable for precision and stunt events. One of the "Fighting Five" series and a perfect flying scale model. As this job flashes by on the end of your lines, you'll experience every thrill that the pilots of the full size planes did when they gave battle to the enemy.

JEM Control Flight Handle $2.50

•FORMERLY $3.95

Whether you say "Jem" or "gem" - here's the gem of all control line handles. The Jem handle is the answer to safe control line flying. It's an all-metal affair, shaped like a pistol grip to fit your hand, and has the very valuable feature of returning all controls to neutral as soon as you remove your fingers from the trigger or push button. It'll soon pay for itself in crashes averted and ships saved. The Jem handle is adaptable to any type of control. It works equally well with "U-Control," "Roller Control" & other systems.

NOTE THESE POINTS -



- The Jem Handle assures absolute positive neutral position.
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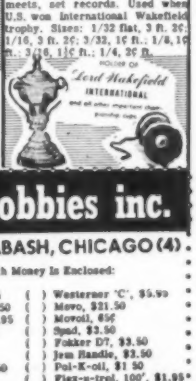

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Check Items for Which Money Is Enclosed:

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( ) Jr. Zoomer, $3.50
( ) Sr. Zoomer, $6.95
( ) Nieuport, $3.50
( ) Merlin, $6.95
( ) Atom, $15.50
( ) Fokker D8, $3.50
( ) Bunny, $1.25
( ) Sopwith, $3.50
( ) Westerner 'A'-$3.50
( ) Westerner 'B'-$4.50
( ) Westerner 'C', $5.95
( ) Movo, $21.50
( ) Movoil, 65¢
( ) Spad, $3.50
( ) Fokker D7, $3.50
( ) Jem Handle, $3.50
( ) Pol-K-oil, $1.50
( ) Flex-u-trol, 100', $1.95
( ) Flex-u-trol, 150', $2.50
( ) T-56 Rubber:

( ) Check here and enclose 10¢ if you wish a copy of our catalog-manual "Controlog", a who's who of more than 110 control line kits, plus flying instructions, other data.

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Model Airplane NEWSLETTER

by AL LEWIS

IN this issue we want to talk a little about our English model airplane building friends—but before we get started on that subject we have one or two points to bring up in the matter of control line flying in this country.

It seems to us—and to a great many others, too—that there are too few modelers showing up at small and large control line contests compared to the vast number of control line kits being purchased in the hobby shops. Granted that a large percentage of such models may never be completed and that there will always be a certain number of "lone wolf" flyers who do not want to mingle with the crowds—yet it is painfully obvious that the present U-Control meets have too small a turnout for the potential number of entries.

What's the matter? Well, this has been the subject of many lengthy discussions of late and we think we know the answer. It comes to us not as a bright green-and-red flash, but as the result of sitting in on a number of bull sessions and listening to some of the country's top experts and model industry leaders discuss the subject.

And it finally came to us while we were motoring out of New York City not long ago with Jim Walker (inventor of U-Control flying), Aubrey "Red" Kochman and Tex Foster, both of the Big City and well known for their participation in the sport over a period of years.

Yep, the trouble we think narrows down to the fact that you've got to be too darn expert to compete in the present stunt and speed events. And the solution? Not to scrap those events, but instead to institute a new one which combines the best features of both, plus recognition for scale, beauty, workmanship and ingenuity. Here's the way we visualize it:

For lack of a better name, let's call it the "All-'round control line event." A unique feature is that all models entered must be on the field at a certain hour—let's say 10:30 a.m. This is because all entries are lined up, divided into scale and non-scale types. The scale models are graded in order—the best one is picked out, then the poorest one, and the rest lined up in order of fidelity to scale and detail. The best model is given 100 points and the others a certain number of points in comparison with the top entry.

After this is completed—and, incidentally, it has given the spectator a splendid chance to look at the models grouped together, something sorely lacking in most U-Control contests—all the models, scale and non-scale, are lined up and rated from 100 down for (1) workmanship, (2) ingenuity, (3) beauty. The first means clean building and good craftsmanship; the second gives points for special gadgets and unique design which appear workable; while the third is straight outward appearance. Thus a solid wing and fuselage model with auto lacquer may be first in beauty judging; but a built-up, paper covered ship may be first in the wokmanship judging.

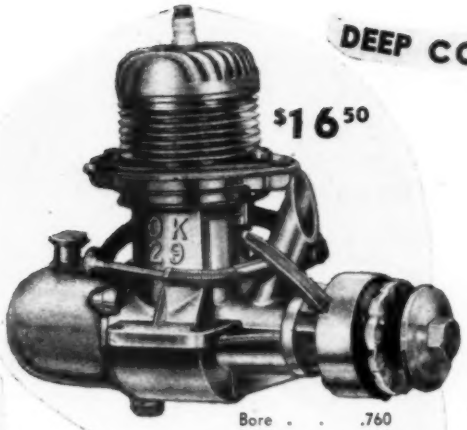
Now let us assume you have brought out a super flying scale model with many of the large-plane fittings and details. It has a wonderful finish and your work is neat as a pin. Maybe you've added an idea or two so that when you pull on the control lines the miniature controls in the cockpit work. Maybe you can actuate the flaps by a third line.

If you were the world's best model builder you would then have collected 100 points for real scale, 100 points for workmanship, 100 points for ingenuity, and 100 points

(*Turn to page* 58)

DEEP COOLING FINS • RAM INDUCTION • HIGH TURBULENCE PISTON •

OK'S NEW SUPER 29



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Bore . . .760
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A year in the designing, testing and production OK's 'SUPER 29' is the new, streamlined star-flyer in class 'B' Sensibly priced—as are all 'OK' engines NEVER OVER-PRICED'

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NOW ANOTHER SPECTACULAR PRICE REDUCTION FROM THE MAKERS OF 'OK' Engines

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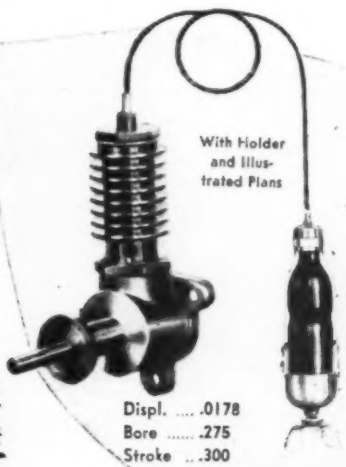

With Holder and Illustrated Plans

Displ. 0178
Bore 275
Stroke ...300

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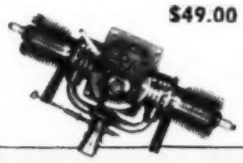
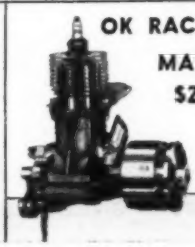
THE 'OK' FAMILY OF EASY STARTING ENGINES

OK TWIN $49.00

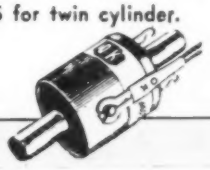


OK SUPER 60 $18.00

OK RACEWAY-MARINE $23.00



OK SUPER COIL
$2.50 for single-cylinder.
$5 for twin cylinder.



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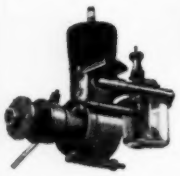

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	Class	
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McCoy 49	C	25.00
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Vivell 35	C	18.00
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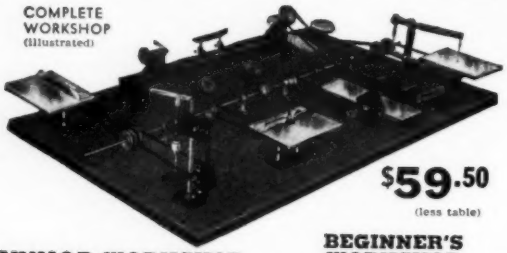
*Includes Coil and Condenser.

COMPLETE WORKSHOP (Illustrated)



$59.50 (less table)

JUNIOR WORKSHOP

Includes Jig Saw, Circular Saw, Drill Press, Lathe, 1 Line Shaft, 2 Collars, 3 Hangers, 5 Pulleys, 5 Rubber Belts. **$34.30**

BEGINNER'S WORKSHOP

Includes Jig Saw, Drill Press, Lathe, 1 Line Shaft, 2 Collars, 3 Hangers, 4 Pulleys, 4 Rubber Belts. **$26.30**

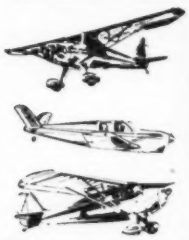
Motor not included. 1/10 to 1/4 H.P. Motor will operate any set or individual tool.

TAYLOR HOBBYCRAFT POWER TOOLS

Precision tools for your model and hobby work. You can now buy these tools separately, as well as in the money-saving workshop combinations. Expertly designed for craftsmen.

Jig Saw and 13 blades	$ 4.95
Lathe 24" bed, 4" face plate, 3" grinding wheel, grinding wheel adapter	10.95
Jointer with 4" steel knives	10.95
Circular Saw, combination rip and cross cut blade	7.95
Drill Press, drill chuck	6.95
Shaper, blade, rubber belt	7.95
Disc Sander, 6" Horizontal Table	2.45
Belt, endless rubber, 25" long	.25
Blades for Jig Saw, standard 6", per doz.	.50
Blades for Circular Saw, Combination rip and cross cut 4"	.75
Blades for Jointer, 4", case hardened, per pair	1.00
For Shaper—steel, case hardened	1.00
Couplings, flexible, 3/4" bore, die cast with set screws	.75
Sand paper discs, for sander 6" dia., per doz.	.60
Collars, for line shaft, per pair	.30
Face Plate for lathe, 4 1/2" swing	.75
Grinding Wheel 3" dia.	.90
Hangers for line shaft, 3 for	1.00
Line Shaft Sections 30" long, 3/4" dia.	.30
Chuck for Drill Press, spring action tool steel jaws. For any drill, round or square shank up to 1/4" dia.	1.00
Pulley, die cast, 2 1/2 O.D., with set screw	.50

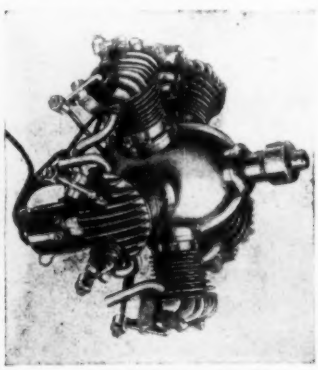
THREE NEW CLEVELAND MODELS



Gas Powered Silvaire $3. Rubber Powered Bonanza and Aeronca Chief $1 each

FREEFLIGHTERS

Honey B, B	$ 3.95
Interceptor (Comet), A&B	2.95
Interceptor (Stanzel), A&B	2.98
Jiffy, A	1.50
Larkey, A&B	3.50
Mike, A&B	2.00
Musketeer 54", B	3.50
Musketeer Standard, C	4.95
Musketeer 42", A	2.50
Mercury, C	5.50
Pacer, B&C	3.95
Pacer, C	4.95
Playboy (Baby), A	1.00
Playboy Jr., B	3.25
Playboy Sr., C	6.00
Piper Cub (Megow), B	6.95
Piper Cub (Capital), A	1.95
Piper Supercruiser, C	10.95
Runt, A	2.50
Roamer, A&B	3.98
Ranger, B	3.00
Rocketeer, A	2.95
Super Quaker, C	8.00
Stinson (Cleveland) C	17.50
Stratostreak, A	2.50
Sailplane (Comet), C	6.95
Spearhead Jr., A&B	1.95
Skyrocket, A	2.25
Stratosphear, A&B	2.95
Topper A, A	3.50
Vagabond, C	3.50
Varsity, A&B	3.50
Wanderer, B	3.50
W.O.G., B	4.95
Yoo, A&B	3.95
Zomby, A&B	3.00
Zipper, A	1.95
Zipper, B&C	5.95



Burgess M-5 Five Cylinder Airplane Engine

Four stroke Cycle, Bore .625, Stroke .600, Displacement .92 Cubic In., Overall Diameter 5 3/4", Rated 12 H.P., Weighs only 22 oz. **$75.00**

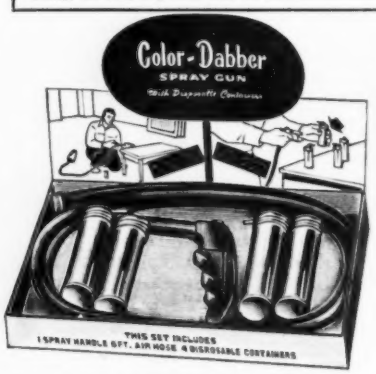
BURGESS M-5 ACCESSORIES

2 Bladed Polished Hardened Alum. Blades, adj. pitch	$ 8.30
3 Bladed Polished Hardened Alum. Blades, adj. pitch	11.75
M-5 Tubular Steel Engine Mount	3.50
M-5 Die cast Ring Mount	3.75

ENGINE PRICES SLASHED

	Class	Was	Now
Bullet	B	$15.00	$12.75
Cannon 300	B	19.75	12.50
Cannon 358	C	21.50	13.50
*Fleetwind	C	24.75	15.00
*Hurricane	B	19.50	12.50
*Merlin	B	21.50	12.50
*Rogers 29	B	15.75	9.95
*Rogers 35	C	16.95	12.50

*Includes Coil and Condenser



COLOR DABBER SPRAY GUN KIT $2.50

For hobby, shop, industrial touch-up jobs. Operates from any compressed air source up to 35 lbs. Can be attached to automobile spare tire for use with home model work.

FAST—LOW COST—SIMPLE TO USE

Fine atomized spray gives even coat with no experience required.

KIT complete with Spray Gun, 6 feet of air hose, 4 Color-Dab disposable containers. $2.50

Additional containers only 25c each.

Airfoiler, B & C	$ 3.95
Aero Champ, A	2.50
American Ace, 36 A	1.50
American Ace, B	3.95
Banshee, B	5.95
Baby Quaker, A	3.00
Buzzard Bombshell, C	9.95
Brigadier 38, A	1.95
Brigadier, B	2.95
Buccaneer, B Spec. B&C	3.95
Buccaneer 36", A	1.50
Buccaneer 48", A&B	3.50
Buccaneer (Super), C	5.50
Buccaneer (Standard), C	5.95
Buccaneer, Special C	6.95
Bee, B	1.95
Brooklyn Dodger, B&C	3.95
Crusader, B&C	7.50
Cavalier 60, B&C	5.95
Coronet, A&B	2.50
Diamond Demon, A&B	2.00
Humdinger, B	5.95

RITE PITCH PROPS

8, 9, 10 or 11 inch	50c
12, 13 or 14 inch	60c

CONSTRUCTION KIT Easy to build. All parts complete. $1

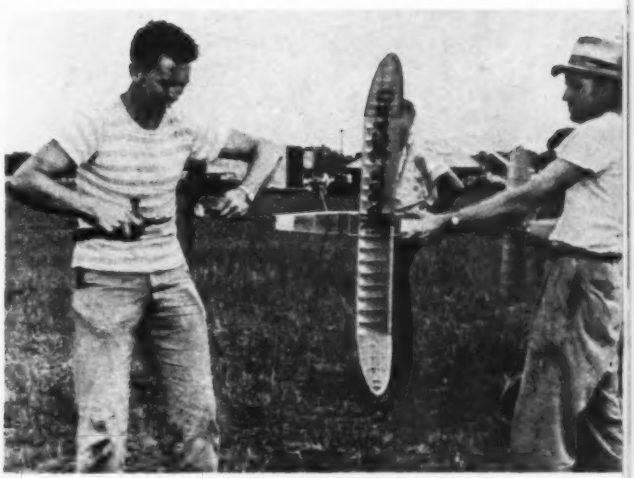
ACE MODEL AIRPLANE COMPANY

3149 SHENANDOAH, ST. LOUIS 4, MO.

★'47★ NATIONALS

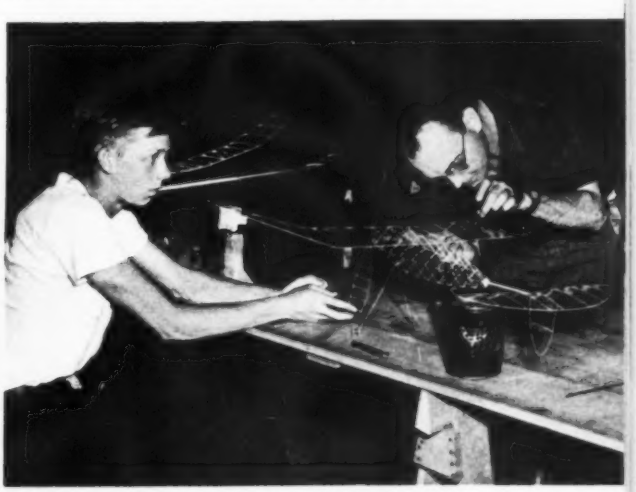
California contestants with trophies. Included are *Thermal Thumbers*, high point club, and Frank Cummings, individual high point winner

Winner of *Model Airplane News* trophy was Jerry Brotman from Brooklyn, N.Y. shown here receiving award from Editor McEntee and Mrs. McEntee



Fred Forrester of Glendale, Cal. holds Wakefield model while owner of model, Paul Gillian, also from Glendale, packs in turns

W. H. Leske of Aberdeen, So. Dak. makes adjustments on his Class C job with assistance from wife Faye. Note flat flying field in background



David Thomas of Indianapolis assists Jim Cahill of Connersville, Ind. while making repairs on Jim's microfilm cabin entry

AFTER a hectic five days, the 1947 Nationals has gone down in history as one of the largest ever held. For once there were no serious complaints against the weatherman, although the middle west was in the scorching grip of a record breaking heat wave that kept everyone sticky and uncomfortable. However, every day had good flying weather and the entrants surely made the most of it. The heat provided the free flight boys with plenty of potent thermals, and the sight of models climbing higher and higher as they drifted out of sight became commonplace.

The good weather even held out right through Friday when the indoor events were held at University of Minnesota field house, and all those who endured the steaming heat of that large building could have little doubt that Old Sol was still doing his recordbreaking best.

As is usually the case, many records were set during the meet, particularly in the control line speed division where practically every record on the books was toppled. Thus, top speed in the combined Classes I and II was made in the Senior division by William Thomas of Daytona Beach, Fla. who hit 92.3 mph. Keith Storey of Pasadena, Cal. topped Class III with 112.8 mph, and also walked off with Class IV and V (combined) honors with 125.5 mph. The team of C. H. Allan and Joe Kitchens made top speed of the meet with a new record of 133.3 mph in Class VI. Yes, the speed boys definitely liked the weather!

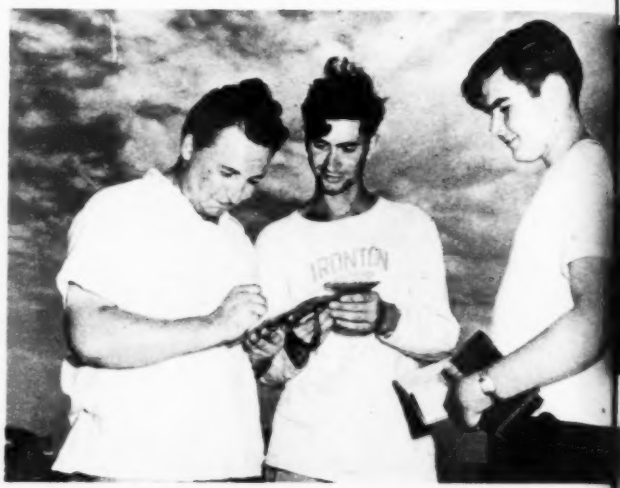
The control line stunt event continues

Wally Wallick winds up speedster with help of Bob Thomas, both Californians

Jim Walker of Portland repairs motor of his radio control ship, held by helper John McKie

Glider of Geoerge Perryman, La Grange, Ga. launched by Connie Caviness of Atlanta

Chet Lanzo of Cleveland, holder of fourth place in individual point scoring, launches his famous *Puss Moth* model which won first



Infallible proof of real fame! Don Newberger, California speed star, gives his autograph to Curtis Bates and Marvin Gothard of Ironton, Ohio

Les McBrayer, the Sidewinder King from Alhambra, and Keith Storey of Pasadena. McCoy 49 job owned by Storey did 126.31 mph

Robert L. Hatschek of Flushing, N.Y. *Prop Spinners Club* sadly contemplates basketfull of wreckage after crackup of his fine free flight ship

to gain in popularity and to win converts from other branches of the sport. This appears to be one branch of the game where a newcomer can break into the ranks of the experts with a fine chance of carrying off honors. Proof of this is the fact that Bob Tucker of Elizabeth, N.J. won top speed in the Open class over such seasoned fliers as John Clemens of Texas and J. C. Yates of Calif. Davy Slagle, last year's Junior champ and High Point Winner, repeated his winning efforts and staggered out of the banquet hall carrying a huge trophy. Davy was seen paying close attention to the activities of the radio control boys—maybe looking for fresh fields to conquer?

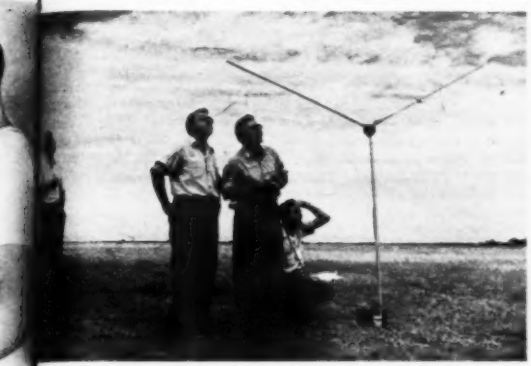
A new event in the control field was the jet-powered speed contest, won by George Sweet of Beloit, Wis. with a speed of 110.3 mph. Many interesting designs were entered, including a beautiful all-metal model of the Bell XS-1. As might be expected, this event was of great interest to the spectators, most of whom had never seen (or heard!) a jet motor in operation.

The flying field at Monticello is really big, and fortunately the breezes almost always blew along the length of it; thus the great majority of models in the free flight events came down right on the field. The site was made available by Clarence W. Hinck, who is Chairman of the Aeronautics Committee of the Minnesota American Legion and was also Chairman of the National Model Contest Committee. In less hectic days the field is the site of Hinck's Flying Service; during the Na-

The boys shovel in the food at Victory Banquet. Impressive array of trophies almost hides speaker's table

Charles Korintar of Detroit Lakes, Minn. launches glider as Allan Johnson looks on

California indoor artists in action. Art Snyder at left and Bill Atwood



Walt and Bill Good operate their radio control job as Harry Geyer watches. Judge Ken Carter kneels at right

Microfilm retrievers at work on tough assignment. Ship hit wire much higher

Wendell Taylor launches his *Sailplane*. Helper Lloyd Miller under hat at left

Leonard Nalty of St. Paul, entrant in stunt event

Davy Slagle of Burbank staggered out with Walker Trophy he also won last year

Don McKercher of St. Louis, Mo. changes a prop in his *Pacemaker* motor

tionals, of course, all regular flying at the field was suspended.

Those whose models hooked a thermal were greatly aided in retrieving their ships by the Jeeps, provided by the meet management. Further invaluable assistance was rendered by several lightplanes, manned by experienced fliers and observers, who tracked down lost planes. At the last count we heard, these fliers had spotted over 40 lost models and were still going strong. Their operation was made even more valuable by the Minneapolis Radio Club which provided radio equipment and operators for use on the field, in the planes, and in several retrieving cars. Many model fliers weren't even aware that anyone was after their planes until they heard the announcement over the field loudspeakers that the models had been found.

All the free flight events, including gas, rubber power and towline glider were well represented. It seemed as though the boys were anxious to take advantage of the large field and the flat open country surrounding it.

As mentioned above, most of the models in the free flight events landed right on the airport, the short and rather sparse grass permitting them to make beautiful smooth landings to the delight of the many spectators.

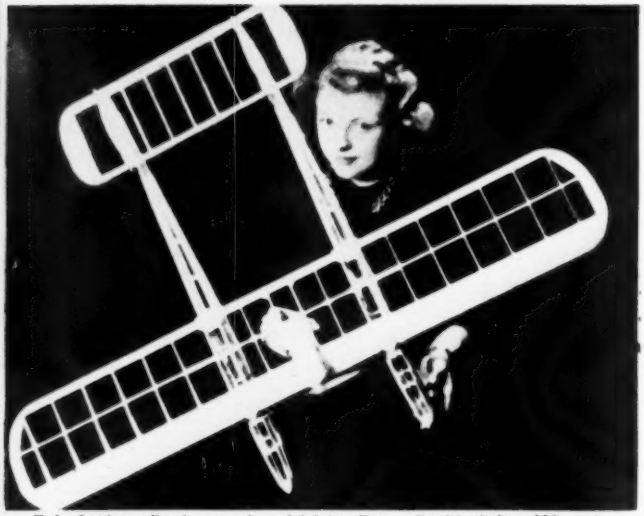
The Radio Control Event marked the re-entrance into competition of several old time experts in this field, including the Good Brothers and Chester Lanzo. This event was a disappointment to many who expected a much larger group of entrants. Those who flew provided a fine show, however, even in the face of serious equipment troubles experienced by such veterans in the field as Jim Walker and W. G. Siegfried. Both of these radio control enthusiasts have very complex equipment, allowing control of several elements in the plane and they were beset by all sorts of difficulties. Walker's last official flight ended in a crash that damaged his model beyond hope of immediate repair, although he had gained sufficient points on this flight to reach top place in the scoring. The next day when flying was resumed, Bill and Walt Good made their last two official flights and amassed just enough additional points to tie Walker. Since Jim's plane was out of the running, the Goods had only to make one more flight for a few extra points; they did this and thus emerged the Radio Control Champs for 1947.

At this point we wish to urge those who intend to enter radio control work to start out with a simple control system in a ship they know well. The Good Brothers won the radio event this year with a model they have been flying for years, and the radio equipment in it was as simple as any in the meet. This should give pause to those enthusiasts who hope to break into radio control with, let's say, a scale model B-29 equipped with elevator, rudder and aileron control, plus radio operated flaps, retractable landing

(*Turn to page* 70)

Al Yount instructs Bonny McKay prior to first controline flight

A 60" free flight Waco biplane powered with Atom engine



Twin fuselage diesel-powered model later flew well with Arden .099 engine

High power loading makes Ohlsson 23 powered Cub a smooth flier

FREE FLIGHT VS CONTROLINE

An oldtimer views modern aeromodelling

by KEN WILLARD

FIVE years ago I carefully packed all my balsa scrap, dope, materials and tools in my basement, closed up shop and took off along with thousands of other modellers to help protect, among other things, our right to design and build models without being dictated to on each step.

Remember how it was then? Controline flying was just getting underway, and the big argument wasn't whether free flight or controline flying was most instructive—it was still raging among the free flighters about the pylon models. There really weren't enough controline fans to start an argument. In fact, the term "free flight" wasn't even in general use. We just referred to "flying models" and "U-control" or "G-line" flying.

A few months ago I shed the olive drab for slacks and a sweat shirt, dusted off my tools, bought some new balsa and glue—at the new prices—renewed my subscriptions to the model mags (they didn't get over where I was) and was amazed to find that, as a free flight enthusiast, I was, and virtually am, a lone wolf in my own club. Sure, the free flight designs keep coming out, but the manufacturers' records show how overwhelming the popularity of the controliners has become.

With a great deal of interest I read the arguments now raging between controline fans and the free flighters. "Aerodynamic design?" scoffed the controliners. "Nuts! Why, an old slabsider can still win a free flight contest. And who ever saw an airplane that looks like some of those crutch and pylon monstrosities? You fellows are just thermal happy. Now you take a really hot controliner—"

"Fooey! Any sap can put a motor on a board, tie a string to it and make it fly," claims the free flight diehard. "But it takes some brains to make a model inherently stable. You fellows with your controliners can have warped wings, lose your rudder, even take off part of the outer wing if not all of it, and the thing will still do what you call 'fly' because you've got lines to one wing tip which keep it in one flight position laterally, and flippers to overcome your mistakes in locating the CG!"

And so it goes on and on, with nobody winning the argument. At first I was just as guilty as the rest; as a confirmed free flight enthusiast, I looked upon the controline boys as a race apart. 'Way back when Jim Walker and Vic Stanzel were plugging their early designs, I built a couple of controliners, flew them, enjoyed it, but didn't get the thrill out of it that the free flight models gave, so I went back to my first love. Recently, when I started building again I built three controliners and four free flight jobs. It's the same story all over again; I enjoy the controline flying, but the thrill of a well executed free flight takeoff, climb, circling glide and landing still beats them all for me. However, I've acquired a great deal more respect for the controline fans since I started modelling again. They're doing a lot for the science of modelling, even if it isn't necessarily in the field of stability.

As a newcomer to the free flight-controline controversy, I sort of analyzed the attractions and disadvantages of both—in my opinion, of course—and came to the conclusion that small changes in each category might serve to improve the quality of modelling throughout.

First, let's list a few of the items frequently discussed in connection with free flight models:

ATTRACTIONS:

1. The educational development from simple gliders,

(Turn to page 37)

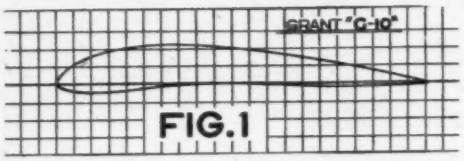


FIG.1

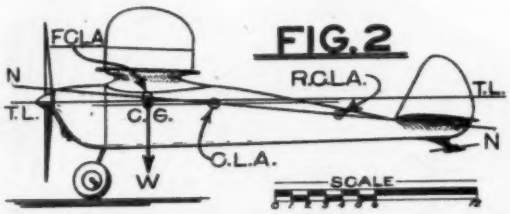


FIG.2

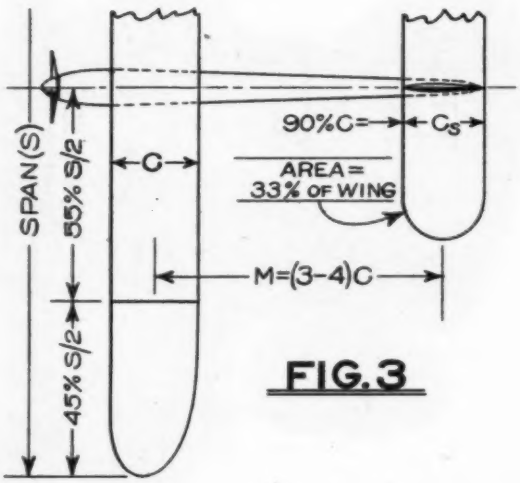


FIG.3

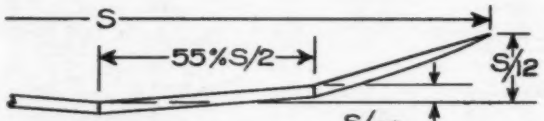


FIG.4

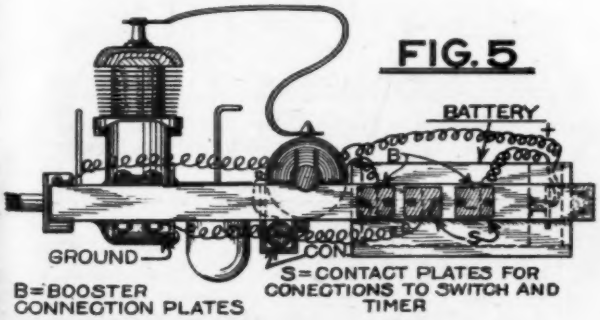


FIG.5

· design forum ·

by CHARLES H. GRANT

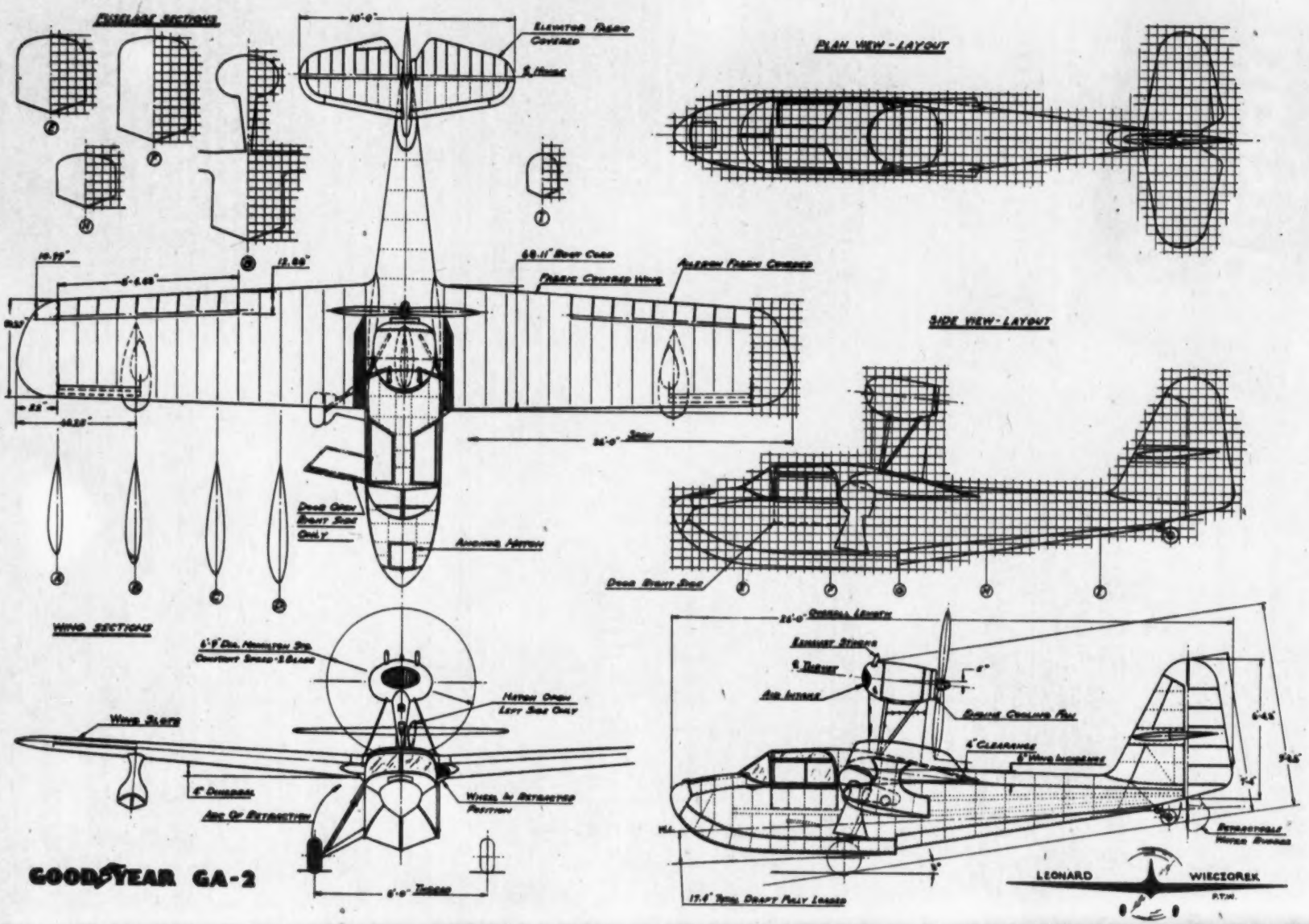
THE Nationals are over and many of you who trekked West to Minnesota have returned a bit crestfallen and empty-handed. A few have taken home the hardware. Whether a winner or not, you unquestionably have stolen a few moments for reflection and adding up the score. If you were one of the unfortunate ones, you asked yourself: "Why did I fail to win?" Some of you of course did not get to the Nationals but flew in sectional contests. Whether Nationals or smaller contests, your problem is the same. You check back carefully over the points which you feel might have been overlooked in creating your contest models; back to the day when the image of that perfect ship, which was going to bring home the bacon for you, took shape in your mind; to the hours of study and toil spent in working out the design, step by step. Then you were sure that your plane would place among the winners.

You check your design carefully again in the light of greater knowledge gleaned through your observations at the National Contest. First, why did the checking official measure your wing area so precisely and carefully? Did he believe that it did not conform to the rules? You measure your wing and weigh the plane—everything seems to be in order. Your plane weighs 16-1/2 oz. The wing area is 227 in.; span 46 in.; chord 5.25 in. These measurements with rounded elliptic wingtips give the correct area. The rule says: "Your plane must weigh at least 7 oz. for every 100 sq. in. of wing area." In other words, your plane should weigh 16 oz. Here, again, you are on the right side of the ledger. The rules also specify that your plane shall weigh at least 80 oz. for every cu. in. of engine piston displacement. Your cu-in. displacement is .199. This is slightly less than 1/5 of one cu. in., so you divide 80 by 5 and your answer is 16 oz. Here, again, your plane is slightly heavier than the required amount.

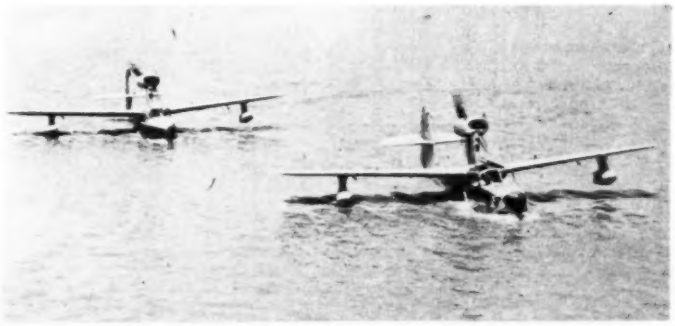
Now, what about your plane's efficiency? The wing has aspect ratio of 46 divided by 5.25, which is approximately 9, sufficient to provide excellent soaring qualities. You distinctly remember that the wing section was chosen carefully. Its upper surface was well cambered; the lower, slightly curved, with a downward sweep in the leading edge called a Phillips Entry. You used this feature to give fast climb as well as lift. You refer to Fig. 1 on your plans to again check its contours. You did not select any of the well-known sections but designed this one from your knowledge of aerodynamics. Requirements were: a fast steep climb followed by a flat long glide. The sweeping undersurface with the Phillips Entry, insures low drag in the climb even though the upper surface is well cambered, so the climb should be fast with the large amount of power in your engine. The upward-cambered undersurface and the high-cambered uppersurface never fail to provide a long flat glide. Similar sections have always been satisfactory when used on other models. Thus you are sure that failure to bring home prizes was not the result of an inefficient wing.

The model was also "clean," well streamlined to reduce drag; in fact, its flights indicated its aerodynamic efficiency both in respect to lift and

(*Turn to page 76*)


FUSELAGE SECTIONS
PLAN VIEW - LAYOUT
SIDE VIEW - LAYOUT
WING SECTIONS
GOODYEAR GA-2
LEONARD WIECZOREK

PLANE ON THE COVER STORY



GOODYEAR GA-2

DID YOU ever hear of an airplane that was CAA approved and in quantity production but none of them were for sale? Believe it or not we found one: the Goodyear GA-2 *Duck* amphibian, our Plane on the Cover this month. Yes, the *Duck* was awarded its CAA Approved Type Certificate last December, after passing all the strenuous CAA tests, and the production line at Akron is turning out 15 of them, but none are for sale!

The reason for this odd state of affairs is a complex sales situation existing within the Aviation Division of the Goodyear Tire and Rubber Co., known officially as the Goodyear Aviation Corp. Goodyear manufactures its famous lines of aircraft wheels and brakes and a number of other aviation equipment items which are used on a wide variety of aircraft, from small personal aircraft to giant bombers. Goodyear is concerned that entry into the manufacture and sale of a personal aircraft, such as the GA-2, in direct competition with other manufacturers, might create a competitive feeling among the purchasers of their aviation equipment resulting in greater sales losses in these activities than any possible sales profits from the manufacture of an airplane.

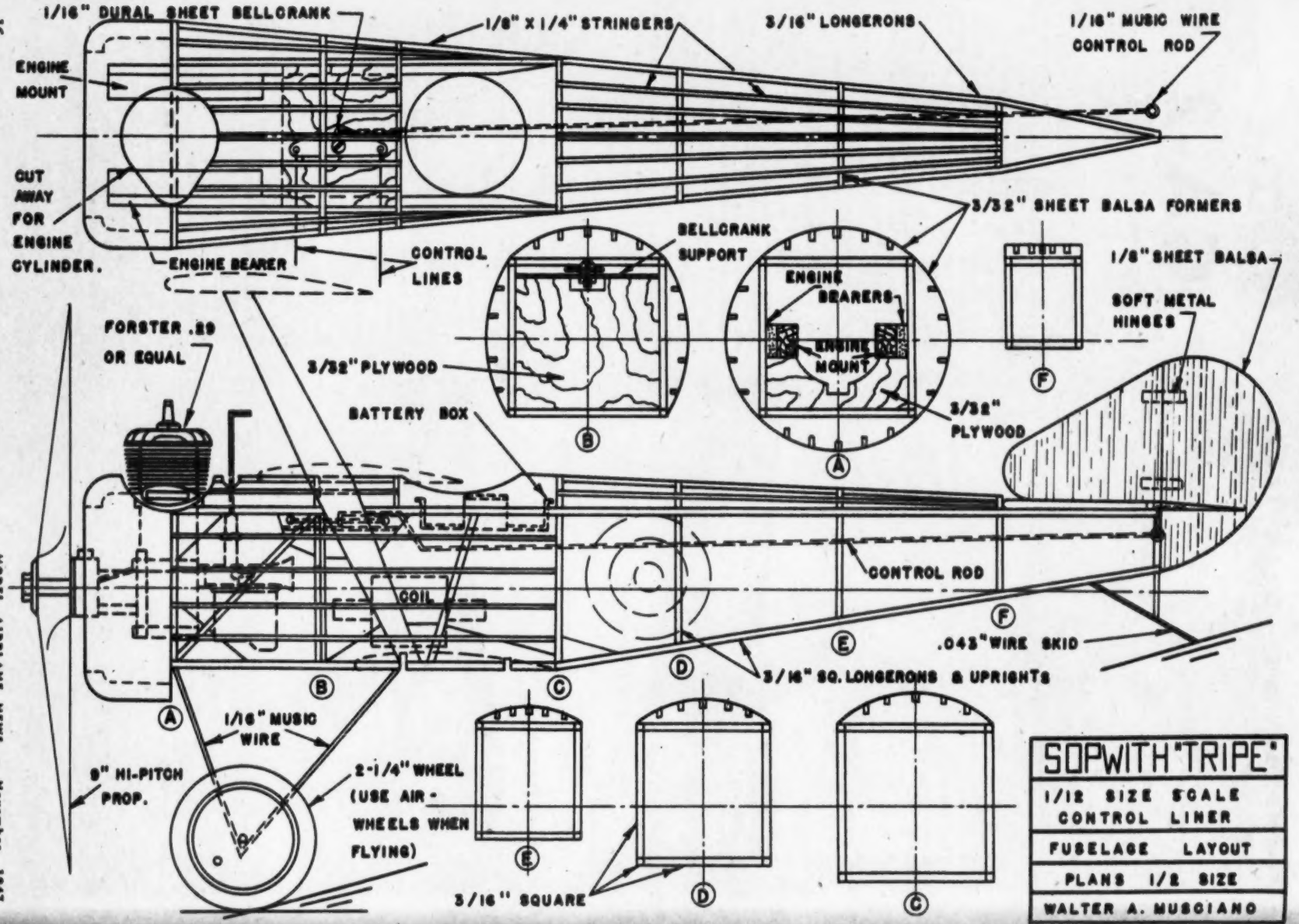
However, Goodyear is proud of its new amphibian and feels it possesses as good or better sales prospects than any other comparable airplane. But it is resolved not to produce the airplane for sale until: (1) all of the "bugs" that can possibly be discovered are ferreted out; (2) a clear picture of other manufacturers' attitude towards this competition is gained. Obviously, purchasers of Goodyear tires, wheels and brakes will see clearly that their money for these purchasers is going directly into a competitive airplane. Goodyear's eventual decision will be based on whether or not this feeling is widespread enough to actually harm their landing gear items, including their newly CAA-approved castoring "cross-wind" landing gear.

Meanwhile, Goodyear is following one of the most unique policies in the aviation business. It is building a production lot of 15 *Ducks*, which will be assigned to regional distributors or dealers throughout the U.S. for several weeks during which time the operator agrees to use the airplane as much as possible, at least half of the time on water flying. During this period the operator will give the airplane a rugged test program designed to prove or disapprove all of its many features. He will prepare lengthy reports on his experiences, data and photos of any malfunctioning parts, and his recommendations for changes or improvements in the airplane. After all reports are in, Goodyear will then evaluate the results to determine whether or not to produce the airplane and offer it for sale. Until then, the Goodyear GA-2 is under glass with a "Do not touch" sign as far as the prospective buyer is concerned.

Older readers who have noticed a familiar appearance about the Goodyear *Duck* are absolutely right, for it is a direct lineal descendant of the Applegate amphibian of prewar days produced by Ray Applegate. The original airplane together with design rights was sold to Piper in the late 'thirties, and the latter was studying plans for its production when the war came. Piper abandoned the idea in favor of landplane types, notably his *Sky Sedan* and *Sky Scooter* designs.

One of Ray Applegate's associates on his am-

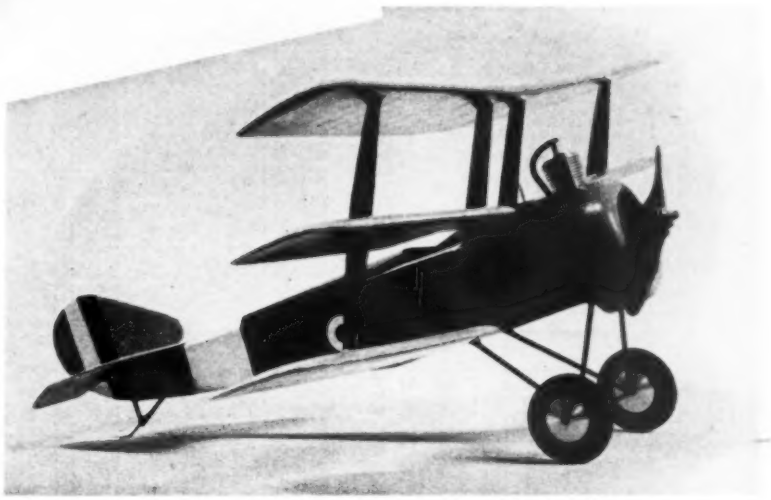
(*Turn to page 69*)



SOPWITH "TRIPE"

1/12 SIZE SCALE CONTROL LINER
FUSELAGE LAYOUT
PLANS 1/2 SIZE
WALTER A. MUSCIANO

SOPWITH TRIPLANE



by **WALTER MUSCIANO**

WHEN your enemy openly praises a weapon of yours you can be sure it is good. Upon witnessing the performance of the Sopwith Triplane, the German Air Force Chief-of-Staff claimed it was the finest ship at the front and much work had to be done to develop an adequate opponent.

The Sopwith *Tripe* made its appearance in 1916 and immediately ran up an impressive string of victories. Superb maneuverability was the reason for its success. Powered by a Clerget Rotary Engine of 110 hp. the Sopwith had a speed of 115-mph. Standard models were equipped with a single Vickers machine gun, although some versions mounted twin guns.

All during his modeling days the author has been intrigued by flying scale triplanes but, try as he did, all attempts at successful "tripes" were in vain. However, with the advent of control line flying this dream became possible.

As a model, the Sopwith Triplane makes an excellent stunt plane because of its concentrated wing area. The high aspect ratio wings and large gap reduce interplane interference to a minimum. The "I" type cabane and interplane struts add to the already simple construction; as will be seen later, these struts simplify the annoying problem of rigging a model of this type. The full scale craft is so well proportioned that the model required no alteration in its outline shape.

A *Forster .29* was used in the prototype with excellent results. Less power may be used successfully but a more powerful engine should not be installed unless the builder has had many hours of control line flying. The plans have been drawn half size with airfoils and struts shown full size. When the plans are enlarged by stepping off with dividers or by means of photostating, they should be studied carefully until every construction step is clearly understood.

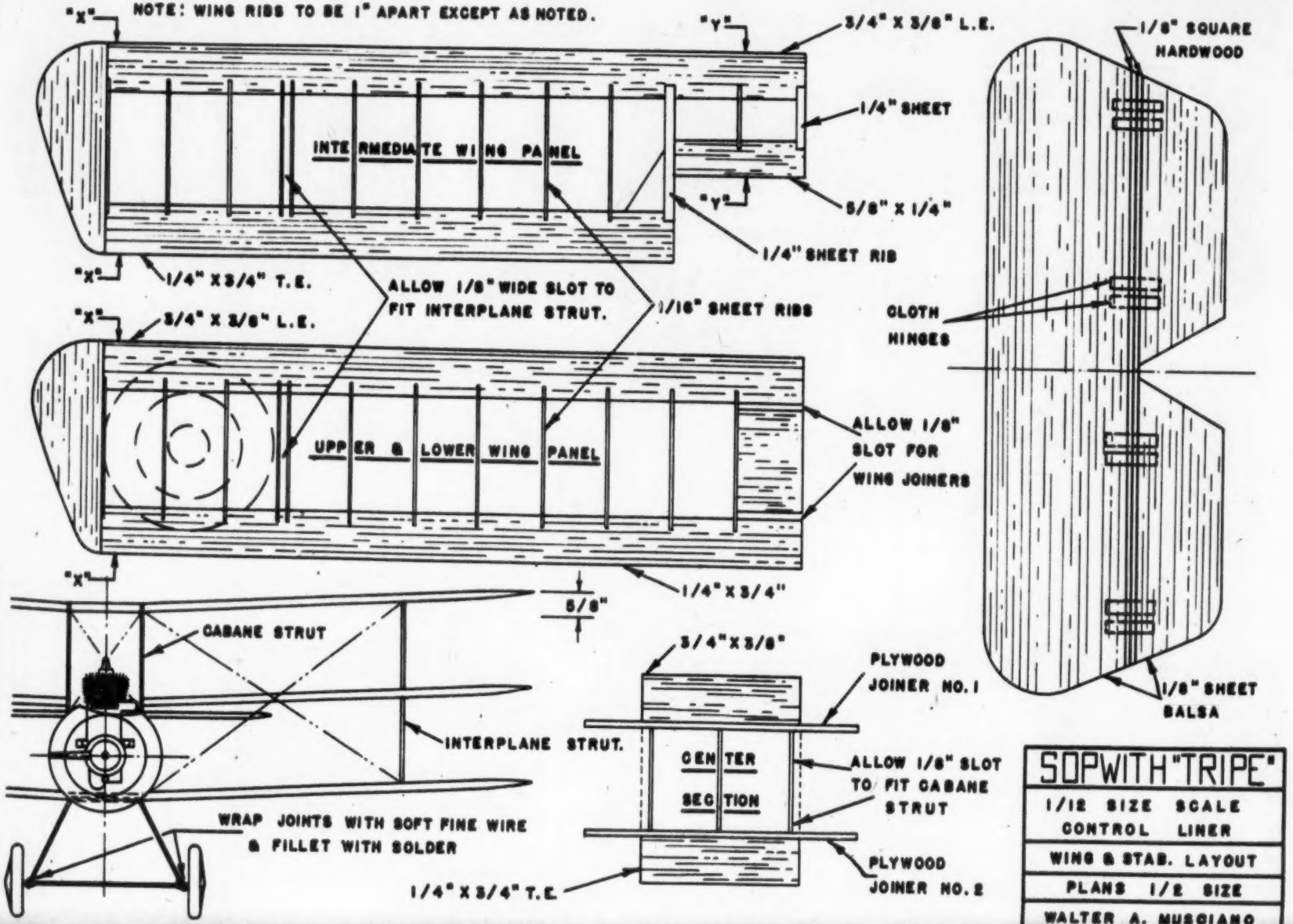
Construction should begin with the fuselage which is made of hard balsa. The side frames are 3/16" sq. with gussets of 3/16" sheet. It will be noted that the ⅛" plywood cabane struts are constructed integral with the side frames.

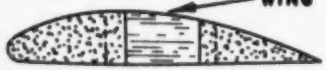
The cowl is made from a soft balsa block hollowed as indicated on the plans. Remember to cement the plywood wing joiners in the fuselage slots. The 1/16" landing gear struts are attached to the forward joiner and bulkhead A. A 1/16" sheet plywood bellcrank support is fastened to bulkhead B and the fuselage structure, using plenty of cement. The tail surfaces can now be cemented to the fuselage and the bellcrank and pushrod installed. Quite often when a model makes a rough landing the engine tears loose and with it come the mounts which rip out a good portion of the fuselage. A method well tried in free flight models is used on the triplane. It consists of an engine bearer ½" by 3/16" cemented well to the fuselage; to this is cemented, rather lightly, the engine mount also of ⅜" by ½" stock. In event of a crash landing the mount will detach from the bearer, thus saving engine and fuselage and cutting repair time to a minimum.

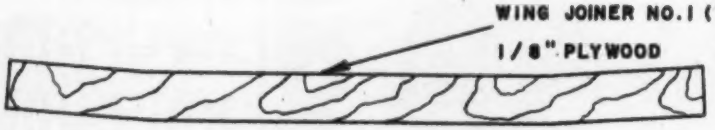
Wiring of the ignition system is next. Be sure to solder all connections. The switch and batteries should be located in the cockpit for accessibility. After all the above mentioned items have been completed, the 3/32" sheet formers and ⅛" by ¼" stringers may be added. The fuselage, from cowl to fuselage station C, is "filled in" with dead soft ⅛" sheet balsa. When the fuselage has been well sanded it is covered with Silkspan and given three coats of clear dope. The model in the photographs has an olive drab fuselage with light blue cowl and white stripe just forward of the empennage. The entire tail is colored buff with red, white and blue rudder stripes.

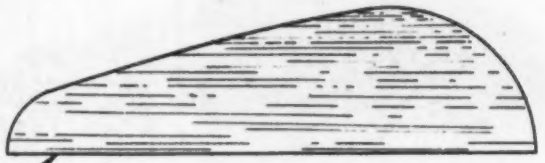
Sparless type wings were selected using heavy leading and trailing edges which have a high strength-weight ratio. Note that the leading and trailing edges are notched to meet the ribs. This simplifies assembly of the wing and strenghthens the structure. The upper and lower panels are identical, and the intermediate panel would have been the same except that the designers had to cut away a portion to

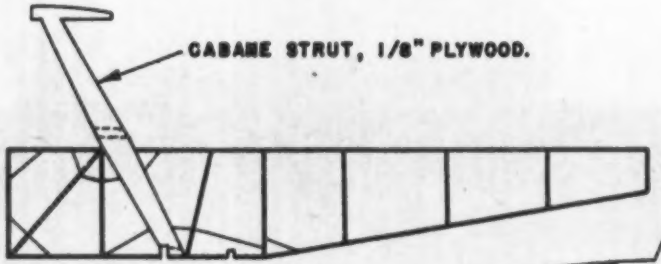
(*Turn to page* 36)

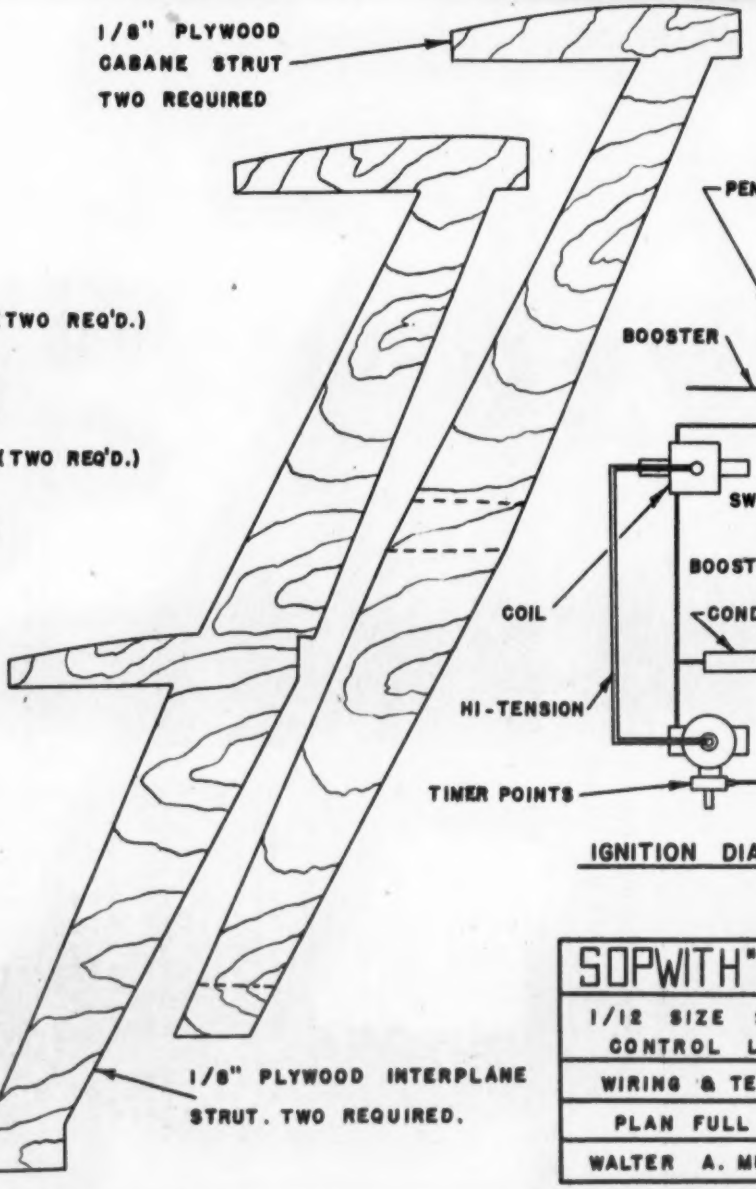

NOTE: WING RIBS TO BE 1" APART EXCEPT AS NOTED.
"X"
"Y"
3/4" X 3/8" L.E.
1/8" SQUARE HARDWOOD
1/4" SHEET
INTERMEDIATE WING PANEL
5/8" X 1/4"
1/4" SHEET RIB
1/4" X 3/4" T.E.
ALLOW 1/8" WIDE SLOT TO FIT INTERPLANE STRUT.
1/16" SHEET RIBS
CLOTH HINGES
3/4" X 3/8" L.E.
UPPER & LOWER WING PANEL
ALLOW 1/8" SLOT FOR WING JOINERS
1/4" X 3/4"
5/8"
CABANE STRUT
3/4" X 3/8"
PLYWOOD JOINER NO. 1
INTERPLANE STRUT.
CENTER SECTION
ALLOW 1/8" SLOT TO FIT CABANE STRUT
WRAP JOINTS WITH SOFT FINE WIRE & FILLET WITH SOLDER
PLYWOOD JOINER NO. 2
1/4" X 3/4" T.E.
1/8" SHEET BALSA
SOPWITH "TRIPE"
1/12 SIZE SCALE CONTROL LINER
WING & STAB. LAYOUT
PLANS 1/2 SIZE
WALTER A. MUSCIANO











IGNITION DIAGRAM

SOPWITH "TRIPE"
1/12 SIZE SCALE CONTROL LINER
WIRING & TEMPLATES
PLAN FULL SIZE
WALTER A. MUSCIANO

AIR WAYS

News of Model Airplane Experimenters All Over the World

No. 1 John Lindley redesigned this glider from an *Albatross* kit—double dihedral is a feature

No. 2 Canard free flighter by Frank Foote proved a big success and gives contest performance

No. 3 Slick navy *Bearcat* by Dirk Newman is powered by Ohlsson 23

THE BIG MEETS. This issue carries full coverage of the 1947 Nationals (see page 9, also "West Coast Tips" page 34) so we need say no more of this event here.

Although we managed to get a flash of results on the big Plymouth International Meet held in Detroit (see page 62), further details together with pictures will be run in the December issue.

Finally, we also include in this issue results of the East-West Control Line Championship Meet (page 36). Here again, fuller details will be published next month.

HOBBY SHOWS. As the season for outdoor model meets draws to a close for most of the country, we are glad to see that many Hobby and Craft Shows are being planned. The forerunner of these was staged in New York last fall and attracted a huge number of spectators, many of whom we believe became active hobbyists.

We now hear that a similar but even larger Hobby, Crafts, and Science Show will be held in New York November 23-30. A similar show will be staged in Chicago Nov. 1-8. Also, another event along the same lines is to be run in Convention Hall, Philadelphia, sometime in October.

These shows have always been highly popular and we believe the three mentioned above are just the forerunners of many more to come in all parts of the country. We strongly urge model plane enthusiasts to attend these shows and see what hobbyists in other fields are doing, if only to gain a greater appreciation of their own particular field of work.

THERE HAS BEEN SOME talk recently of splitting up the Nationals. Proponents of the idea envision a Control Line Nationals, a Free Flight Nationals, a Radio Control Nationals, and so on. We must admit that the number of events that must be included in a single Nationals is growing rapidly. There is a good possibility that free flight events may be split into the same six classes as are now used in control work. It appears that separate events may be necessary for CO_2 models—and here, too, several classes will probably be required since there is a new CO_2 motor now on the market that is about half the size of the original *OK* job; still more sizes may soon be announced.

It seems possible that a professional category will be added to each event flown, in addition to the usual Junior, Senior, and Open Classes.

Many of the flyers at this year's Nationals expressed disappointment that the ROW events weren't included. If all these many additional classes, events, and categories were included at one meet, the Nats would take a month to runoff, so perhaps the talk of having three or four Nationals is not so far off the beam at that. What do *you* think?

• •

Picture No. 1 shows a redesigned Cleveland *Albatross* built by Don Lindley, R.F.D. 3, Fairmont, W. Va. The leading edge of the wing is plated with 1/32" balsa and the entire wing is cap stripped. The tail assembly is constructed in the same manner except for the cap strips. The body is constructed as planned except that it is filled in with 1/8" sheet balsa. The plane is equipped with an Austin timer dethermalizer. The balance box has a hinged door. The wing is demountable in three sections and the two outer panels fit into the center panel by three pine keys. The paint job is red with blue trim and yellow pin stripe, though the pin stripe doesn't show up in the photos. Directly under the cockpit is the word "Playboy" emblazoned in yellow letters with blue shadow. Don writes that he is 15 and has been building models for 8 years.

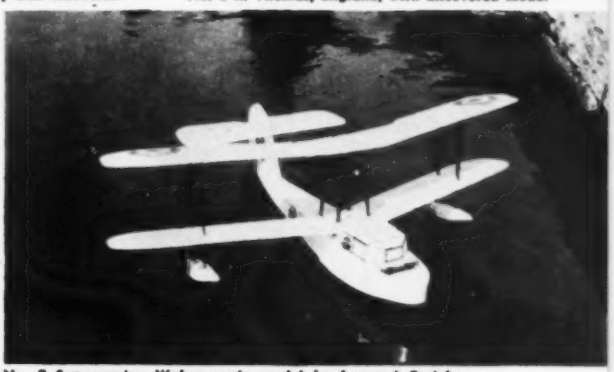
No. 2 shows a canard type model built by Frank Forte, 41 King St., Belleville, N. J. Wingspan is 54 in. and chord is 9 in., which gives it a wing area of 460 sq. in. on the main wing. At a contest its 32 oz. gives it a wing loading of 7 oz. per 100 sq. in., but these rules do not count the 153 sq. in. of the front wing which raises

No. 4 Vann Love's class D job from M.A.N. plans

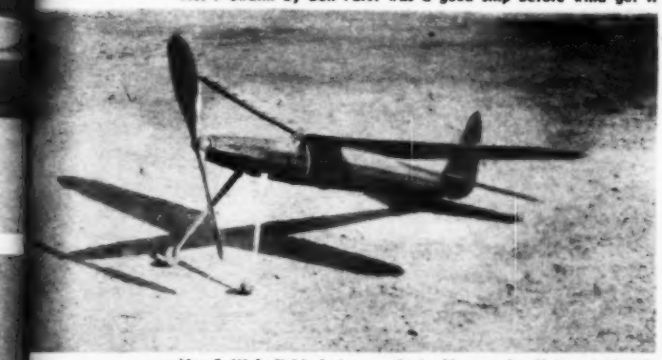
No. 5 Hot Rock by Bob Knowlton

No. 6 R. Thomas, England, with uncovered model

No. 7 *Swami* by Ben Furst was a good ship before wind got it

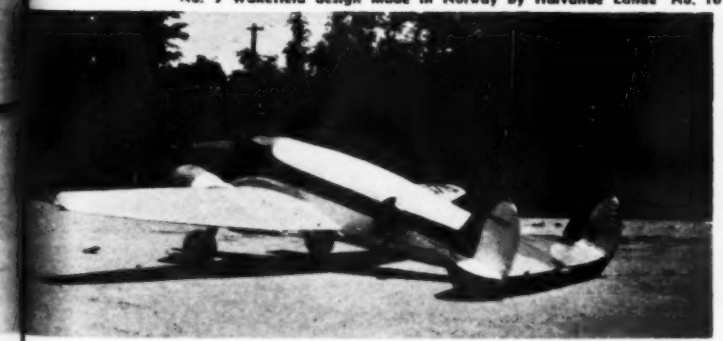


No. 8 Supermarine *Walrus* scale model by Leonard Opdyke



No. 9 Wakefield design made in Norway by Halvande Lande

No. 10 Coaxial helicopter has given Norman Kossuth fine flights



No. 11 Wylam plans were used by Gene Morava for this Lockheed *Hudson*

No. 12 Belgian control liner by Lawrence Lammens

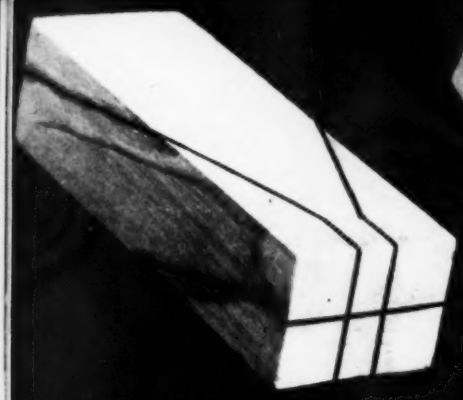
total actual wing area to 613 sq. in. and an actual wing loading of 5-1/4 oz. per 100 sq. in., which is a decided advantage. One unique feature of the ship is that the cowling, wing pylon and rudder are one structure which saves both weight and drag. The low dihedral used in the main wing adds much to the lift which is lost in polyhedral because of tip spilling. The model has the NACA 6409 airfoil in both wings and the two wheels are fixed in their streamlined position. The model is powered by a *Forster 29*.

No. 3 was sent in by Dirk Newman, 1817 Francisco St., Berkeley 3, Calif., and shows his model of the Navy *Bearcat*. It is powered by an *Ohlsson 23*, has a 2 ft. wingspan, is doped dark blue with yellow squadron numerals and has a detailed cabin. Dirk writes that his five cats had a fine time pawing or chewing the lead wires while he was building the model. The excellent photograph was taken by James O'Malley of Oakland.

Vann Love, R.R. 1, Box 150-A, Charlotte, N. C. submitted No. 4 of his model of the Goodrich Trophy Winner from September 1943 issue of M.A.N. The one bladed prop shown is from the Class D stick model in December 1945 M.A.N. This prop was found to give a higher climb with less rubber than the original two blade prop. Being overweight from gas model Silkspan covering, the plane averages only two minutes in evening air as compared with the three minutes of the original.

Bob Knowlton, The Hobby House, 806 Caroline St., Fredericksburg, Va. sent in No. 5 showing C. G. Middlebrook's Canard type control line model. Model fans at a recent contest at Fredericksburg were amazed at the flying of this model. The hot ship (32 mph) is powered by an At-

(*Turn to page 42*)



No. 1 The block ready for carving

No. 2 The block has been cut to outline shape

No. 3 Saw cuts are made to guide cutting

No. 4 Cupping the blade is shown here

No. 5 Inside of blade ready for sanding

No. 6 The blade outline is trimmed

No. 7 Carving is finished—doping comes next

No. 8 Blade all ready to power your model

by AL CASANO

MANY potential rubber power builders never get past the "Like to build it" stage due to the lack of know-how in propeller blade carving.

The gas job building cousin may, for a pittance, buy himself a gas prop that is really good and spend no more time or thought on it. Not so, however, for Joe Rubber. He must lay out and carve a lightweight, yet fairly strong prop, and since performance is dependent to no small degree on the prop it must be right on the ball to give contest results.

Let's digress here to say that the trend toward "pre-fabricated" kits, props, etc. has its points but does not tend to develop the skill of the builder. There are too many "production" builders and not enough really skilled craftsmen.

This script has to do with the carving of prop blades. The type of hub is optional, and since most builders have their own pet hub ideas let's just say that any hub will do if it gives good results and stands up under hard use. Hub construction is simple and needs no help here. It's the blade carving that really gets the boys down, so blade carving instructions it shall be.

First of all, use a very sharp, fairly long-bladed jack-knife or equivalent. Choose a medium weight balsa block of fairly straight grain—don't use hard balsa. If your favorite ship spirals in, the blade will go—hard balsa or no hard balsa—and besides, medium stock, well-doped after carving, makes a good tough job.

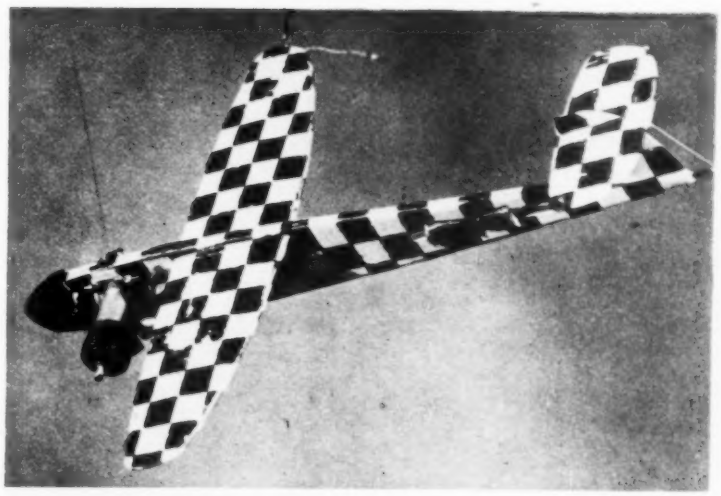
The blank shown is for a 14" diameter prop, and by using the same proportions on length, the 1½" x 2" block is O.K. for diameters up to 17".

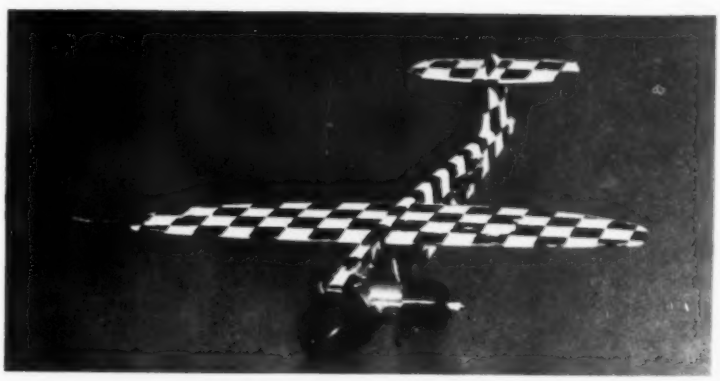
(*Turn to page* 63)

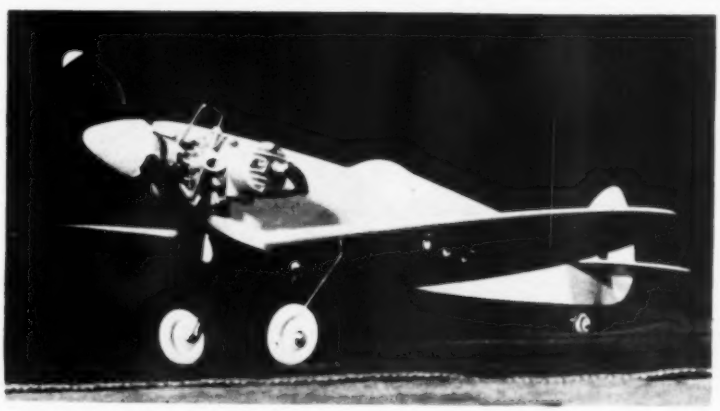
Ever have the lines go slack? With the system described you will still have control

"Miss L"

by J. L. McLARTY







THE *Miss L* does not depend upon tight lines to keep it under control. A solenoid (electro magnet with moving core) moves the elevator, using a battery and a copper line to supply the power. The parts are simple, inexpensive, and require no special equipment to build. If you enjoy trying something different, this arrangement is worth experimenting with.

The size that *Miss L* is best adapted to is class A and B. Those builders looking for a conventional U-Control model will find that this model can be made to use their favorite control.

Besides having the feature of electric control, *Miss L* has balsa sawdust filling the wing and tail surfaces. This gives a perfectly smooth contour seldom obtained on model surfaces even after hours of work. Another feature is the sandwich fuselage with cutouts for mounting the engine, fuel tank, coil, batteries and solenoid.

The plans are full size. Parts not dimensioned can be traced or measured directly from the plans. A complete list of materials is given at the end of this article.

WING AND TAIL SURFACES—Cut out the spars from hard balsa or bass. Trace outline of wing on 1/16" balsa and cut to shape, tapering the edges as shown on plan. Cut out the tail surfaces using 1/32" balsa and taper edges as shown. Cement bottom of wing, stabilizer and elevator to their spars. When dry, cement 3 lengths #22 copper wire along front of the wing spar on the right side. Let the wires extend several inches from the tip and through the bottom of the wing near its center. Next cement the upper surface on the wing, stabilizer and elevator, using bent pins to clamp the edges together. Leave a small opening at one tip, each side of the spar. The spaces inside the wing and tail surfaces are filled with balsa sawdust. This should be put in, small quantities at a time. Pack tight with a small hardwood dowel until the surfaces are firm when squeezed between your fingers. The sawdust can be made from balsa scraps with a handsaw. After the wing and stabilizer are sealed, cut a small hole in the center of the stabilizer next to front of the spar. Push the fin spar through and cement well. Be certain the spar is at exact right angles to top of the stabilizer. After this is dry, the fin surfaces can be cemented in place. Bend the stabilizer hinges and cement as shown. Bend the elevator hinges and control arm and cement in place.

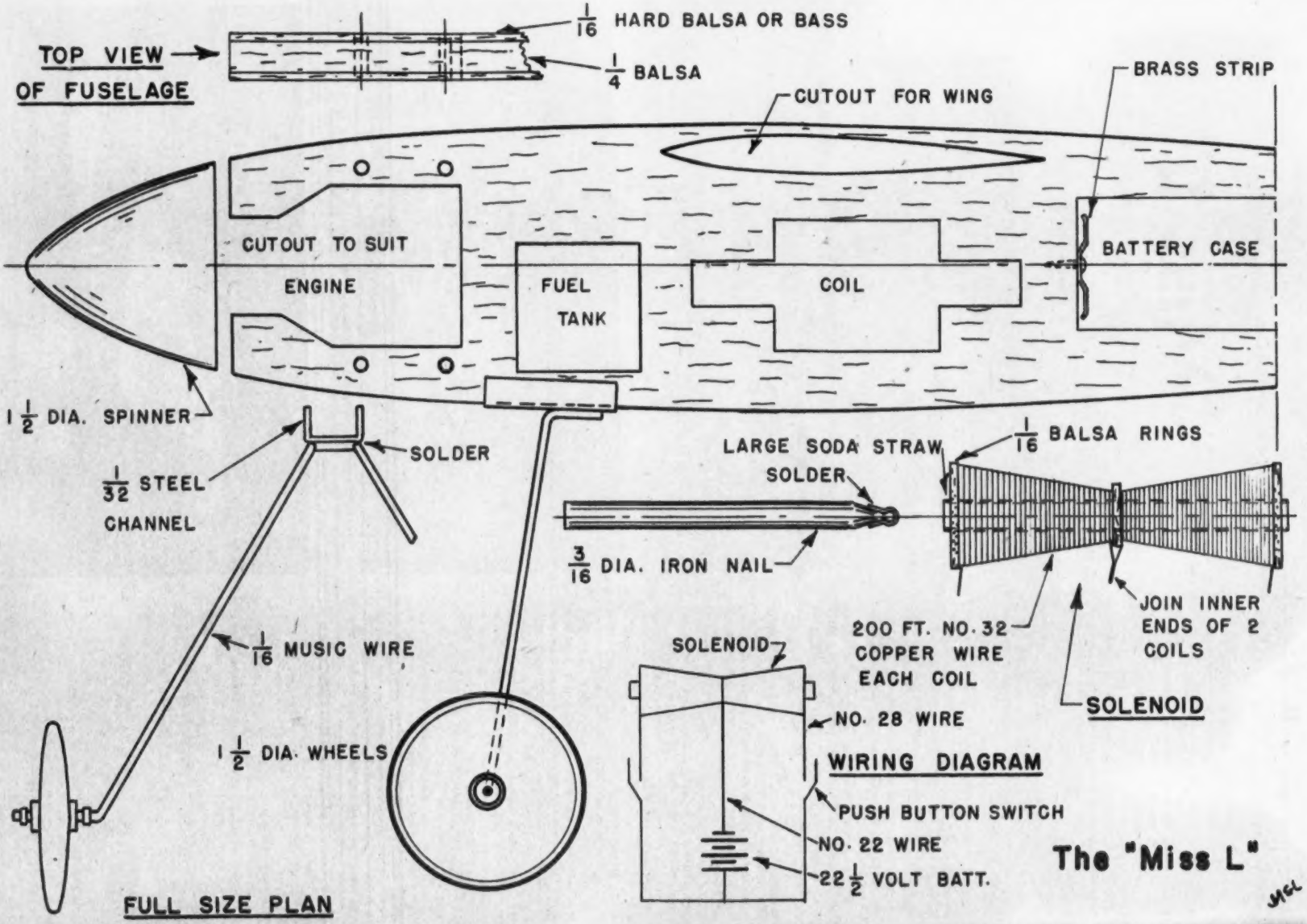
FUSELAGE—The fuselage is of sandwich construction, having two 1/16" hard balsa or bass sides with a 1/4" balsa center. Use model cement or synthetic glue and let dry at least 24 hours on a flat surface with plenty of weight on top.

The cable for carrying current from operator to the solenoid is made up of three wires, bound with thread every foot or so, and cemented together. Two wires are #28, one is #22 wire. The cable should be at least 50 ft. long.

The control handle is made up of two push button switches mounted on a flat stick to fit your hand.

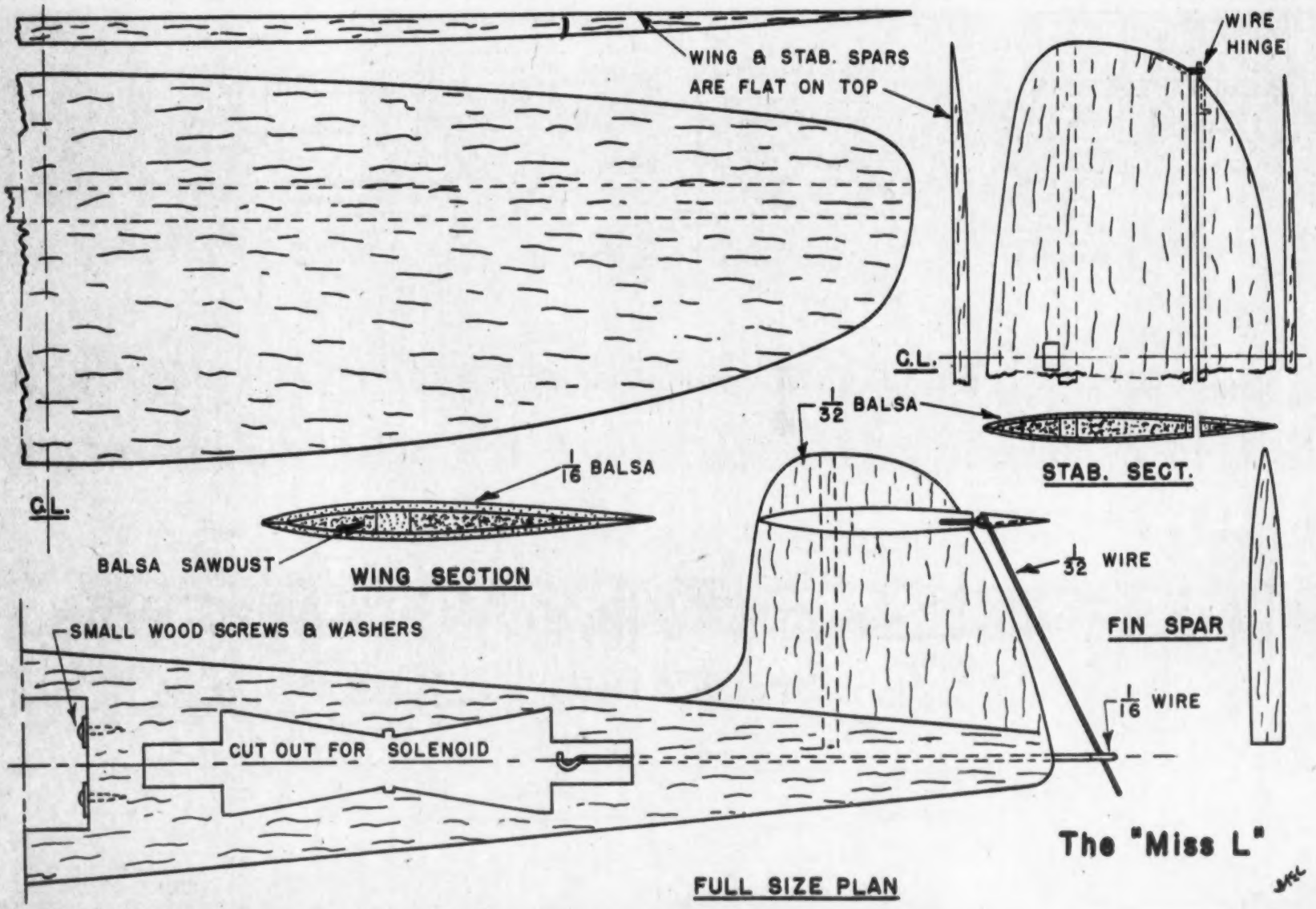
The solenoid is made by winding #32 wire on a large soda straw. Use 200 ft. of wire for each coil. Wind more turns on the outer ends to make the coils tapered as shown on the plan. Join the two ends of the beginning of each coil as shown. When completed, dope the outside to keep the wires in place. Cut an iron nail to length and solder a bent pin as

(*Turn to page* 60)

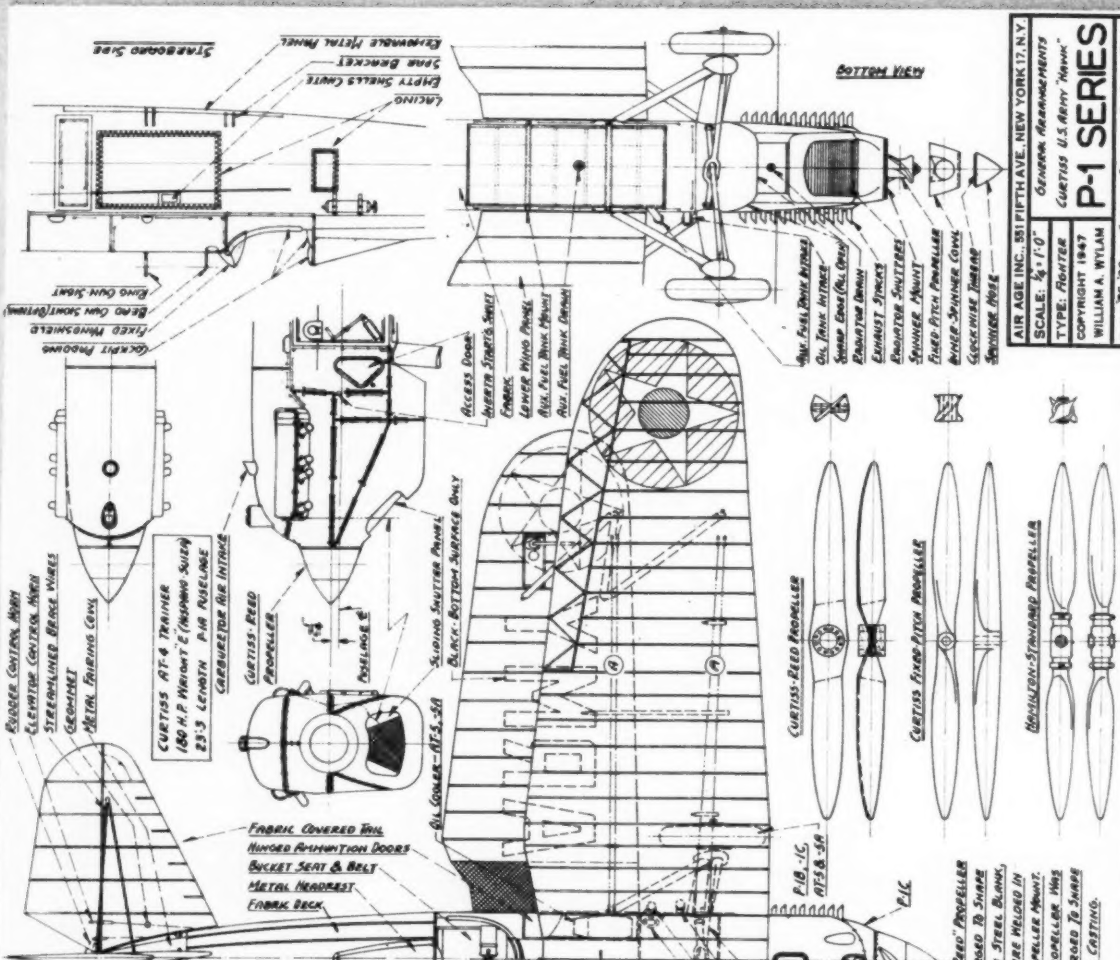


The "Miss L"

JHCL


WING & STAB. SPARS
ARE FLAT ON TOP
WIRE
HINGE
C.L.
1/32 BALSA
STAB. SECT.
1/16 BALSA
C.L.
BALSA SAWDUST
WING SECTION
1/32 WIRE
FIN SPAR
SMALL WOOD SCREWS & WASHERS
1/16 WIRE
CUT OUT FOR SOLENOID
The "Miss L"
FULL SIZE PLAN

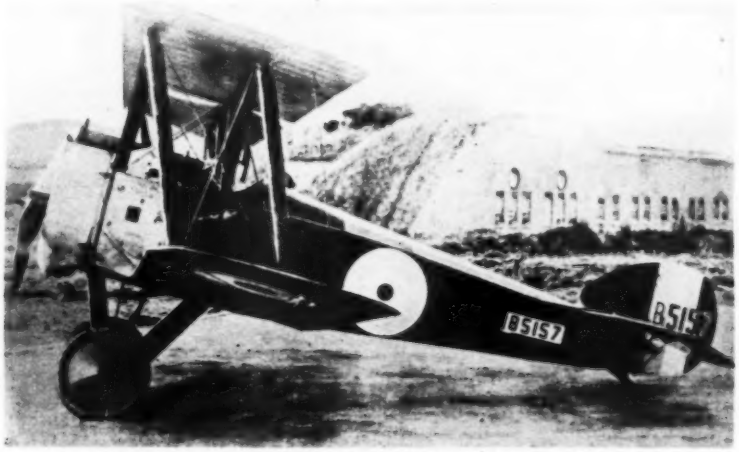
This is the first of 4 pages on the Curtiss P1. To be continued in the next issue.



● WYLAM MASTERPLAN ● WYLAM MASTERPLAN ●

WORLD WAR I

by ROBERT C. HARE



This *2F.1 Camel* has BR.1 engine. Sweepback of lower wing is clearly seen here

2F.1 Camel had large dihedral in lower wing, short center section, long landing gear

F.1 Camel as used by the Seventeenth and 148th Aero Squadrons, A.E.F.

LAST month we discussed the much "cussed" Sopwith *Camel* type F.1 and had a look at its design and structure. Also detailed were the reasons for the *Camel's* bad reputation and the effect it had on certain military groups at various stages in its career. A look at both sides of the ledger, however, proves that the *Camel's* actual performance in service swung the balance well into the credit side. It is a definitely recorded fact that *Camels* accounted for more of their opponents than any other aircraft regardless of nationality. True, the fact that there were more *Camels* in service than any other single type had something to do with it, but we mustn't overlook the equally important fact that they were first class fighting airplanes.

The Camels Are Coming

Two of the best examples of the *Camel's* excellence in the hands of experienced pilots come to us from the records of the A.E.F., strangely enough. Two American squadrons, both attached to the R.A.F. and flying *Camels* exclusively, hung up records believed unequalled in World War I annals. From July 8, 1918 to the Armistice, the 17th Aero Squadron accounted for 64 German planes in 1839 hours of offensive patrols and dropped 24,000 lbs. of bombs in 426 additional hours of ground strafing. The 148th Aero Squadron, over the same period, shot down 66 eagles of the German cross in 1725 hours of offensive operations and dropped 30,000 lbs. of bombs in only 385 hours of additional ground attack. For their exploits, four pilots of the 17th and six of the 148th were decorated with the Distinguished Flying Cross.

Crowning glory to the achievements of the 17th and 148th occurred on Oct. 27, 1918 when these two American squadrons, outfitted with type *F.1 and 2F.1 Camels*, put Ernst Udet's famous "Bavarian Blue Tail" squadron out of action. The most amazing part of the incident was that neither American squadron lost a man!

The 17th went out the morning of the 27th, tangled with the "Blue Tails" (second Bavarian Pursuit Group) and knocked down six of their Fokkers, after which the Germans decided they had had enough. Seventeen came home without loss and called up 148 to tell them about it. Since this looked like good sport, 148 went out that afternoon, met the same bunch and took care of five more, also without losing a man. That was the last ever seen of the "Blue Tails."

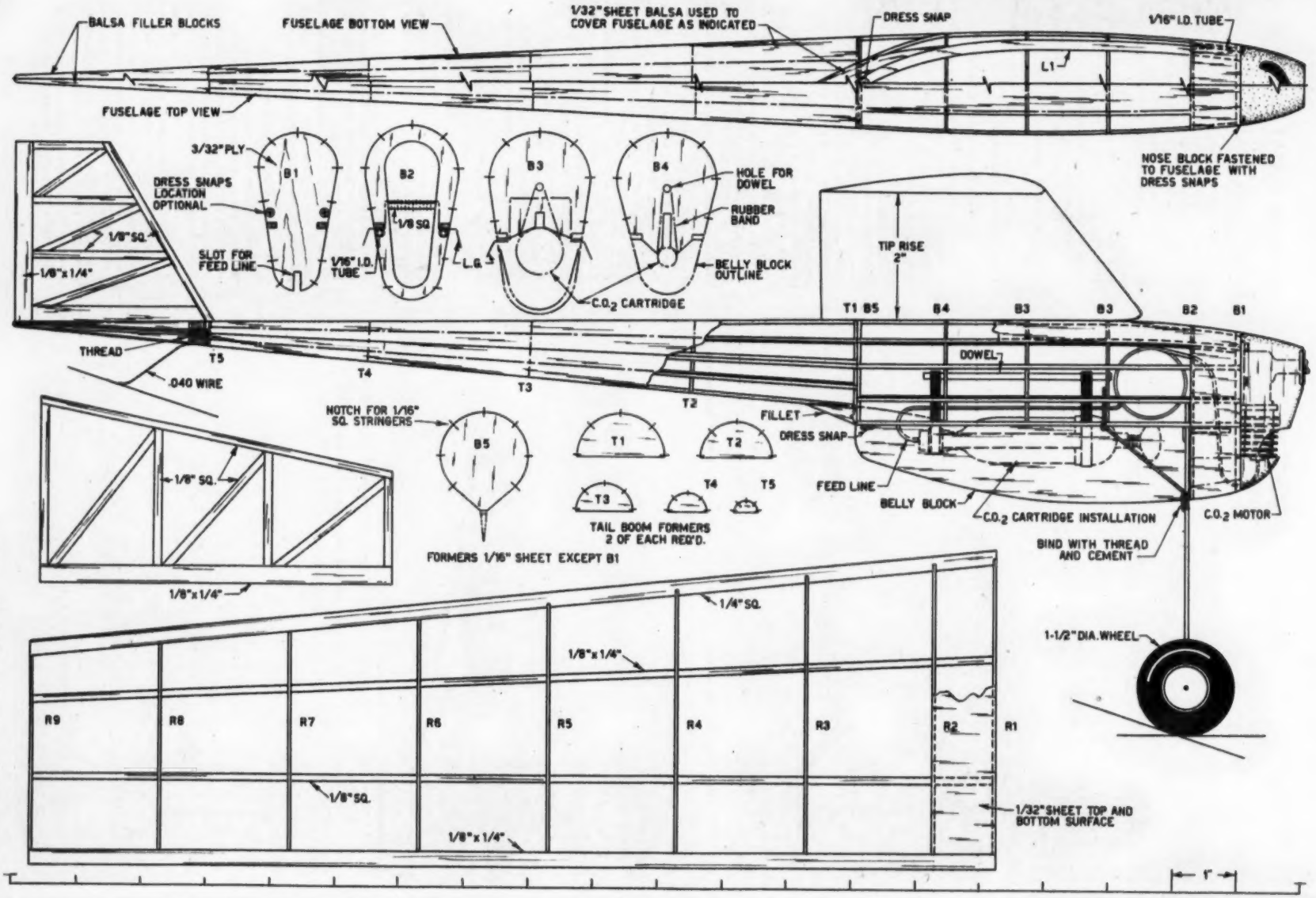
The next day, 148 ran into a flight of eight Fokkers that had been thrown into the sector in place of the Bavarian group, and 148 downed them all without a loss. Some German Commander probably was wondering if some new weapon had been developed by these American squadrons!

Camel Performance

Printed here is a chart showing performance of every model Sopwith *Camel* used on active service. It does not include several experimental variations known to have been built to test proposed improvements, nor a two-seater *Camel F.1* modified at Cranwell. The two-place *Camel* was modified from a standard single seater and fitted with dual controls to show trainees how to handle the *F.1* safely. Since this was a "station project" no performance information is available, but it can be assumed to be little inferior to a stock *Camel*.

Last month, the *Camel's* gyroscopic troubles were discussed in some detail, and it might be assumed that the little ship was

(*Turn to page* 65)


BALSA FILLER BLOCKS
FUSELAGE BOTTOM VIEW
1/32" SHEET BALSA USED TO COVER FUSELAGE AS INDICATED
DRESS SNAP
1/16" I.D. TUBE
L1
FUSELAGE TOP VIEW
NOSE BLOCK FASTENED TO FUSELAGE WITH DRESS SNAPS
3/32" PLY
B1
B2
B3
B4
HOLE FOR DOWEL
RUBBER BAND
DRESS SNAPS LOCATION OPTIONAL
1/8 SQ.
1/8"x1/4"
SLOT FOR FEED LINE
1/16" I.D. TUBE
L.G.
BELLY BLOCK OUTLINE
C.O2 CARTRIDGE
TIP RISE 2"
T1 B5
B4
B3
B3
B2
B1
THREAD
.040 WIRE
T5
T4
T3
T2
DOWEL
NOTCH FOR 1/16" SQ. STRINGERS
B5
T1
T2
T3
T4
T5
FILLET
DRESS SNAP
FEED LINE
BELLY BLOCK
C.O2 CARTRIDGE INSTALLATION
C.O2 MOTOR
BIND WITH THREAD AND CEMENT
TAIL BOOM FORMERS 2 OF EACH REQ'D.
FORMERS 1/16" SHEET EXCEPT B1
1/4"SQ.
1-1/2" DIA. WHEEL
R9
R8
R7
R6
R5
R4
R3
R2
R1
1/32" SHEET TOP AND BOTTOM SURFACE
1"

MODEL AIRPLANE COURSE
FOR BEGINNERS

A CAREFULLY PLANNED AND TESTED SERIES OF ARTICLES FOR BEGINNERS IN THE ART OF BUILDING AND FLYING MODEL PLANES

LESSON 7—Try This CO_2 Powered Model

THE airplane in Fig. 23 is a built-up outdoor model powered by a tiny CO_2 engine—it is ideal for transition training from rubber to gas powered models and is the project in this lesson.

Materials Required—1. Seven 3 ft. lengths of medium hard 1/16" square balsa strip.
2. Two sheets of 1/16" balsa.
3. Two sheets of 1/32" balsa.
4. Four 3 ft. lengths of medium hard 1/8" sq. balsa strip.
5. Six 3 ft. lengths of medium hard 1/8" x 1/4" balsa strip.
6. Two lengths of medium hard 1/4" sq. balsa strip.
7. One piece of 3/32" plywood 1-1/2" x 3".
8. One soft balsa block 3" x 1-1/2" x 1-1/4" for the nose.
9. One soft balsa block 5-1/2" x 1-1/4" x 1-3/4" for the belly.
10. Two soft balsa blocks 3" x 3/8" x 3/16" each.
11. One piece of 1/8" dia. dowel 3" long.
12. One 15" length of .040" music wire.
13. One 15" length of 1/16" dia. music wire.
14. One pair 1-1/2" dia. light weight wheels.
15. One sheet of Silkspan (color optional).
16. One CO_2 engine with cartridge holder.
17. A supply of CO_2 capsules.
18. One readymade propeller 8" dia. x 3" pitch.
19. Three #3 round head screws or suitable nuts and bolts for mounting engine.
20. Aluminum tubing 2" long x 1/16" I.D.
21. Three dress snaps.
22. Large bottle of clear dope.
23. Tube of model airplane cement.
24. Spool of thread.
25. Short length of flat rubber (size optional).

Tools Required—1. Wax paper; 2. small brush; 3. artist's spray tube; 4. sharp knife; 5. razor blade; 6. half round wood chisel; 7. long nose pliers; 8. wire cutting pliers; 9. small hack saw; 10. package of varied grade sandpaper; 11. ruler; 12. pencil; 13. scissors; 14. pins; 15. carbon paper.

Construction—Although the structural design of our model varies from the simple boxtype used for the previous ship, procedure for assembly does not differ greatly. Our first task is to enlarge or obtain full size working drawing of the model. In addition to having to transfer rib shapes from the plans to the balsa sheets in this model, fuselage and tail boom formers are also handled in the same manner.

Fuselage—The fuselage consists of several sub-assemblies or sections of various size, shape and crossection. Basically these are as follows: Nose block, forward body or fuselage section, belly block, and tail boom. The nose and belly blocks, constructed of soft balsa (sizes designated in the bill of materials), should offer no new problem to the builder. Formed and shaped externally in a straightforward manner, only the gouging out or "hollowing" process may be slightly unfamiliar. To accomplish this we use a half round chisel and finish the cut with sandpaper. Wall thickness of slightly under 1/16" is desirable. Slightly thicker wall sections, however, are not detrimental. Sufficient extra thickness should be allowed in the areas where dress snaps are to be cemented. Slots for the landing gear wire and for engine exhaust are cut after the pieces have been formed and sanded.

The forward fuselage section consists of formers B-1 to B-5. These are held into position by 1/16" sq. balsa stringers. Provisions are made for installing the CO_2 motor and power supply cartridge onto the sub-assembly. The motor is fastened to former B-1 with three #3 screws or with #3 nuts and bolts. The power cartridge holder is secured to the bottom of formers B-3 and B-4 by rubber loops extended from a length of 1/8" dia. dowel cemented within the fuselage as shown in the plans. Incidentally, although not recommended by the makers, the horizontal mounting of the cartridge and holder has caused no trouble at all.

A dress snap is cemented to the aft end of the 1/16" sheet longerons L-1, while two short lengths of aluminum tubing 1/16" I.D. are cemented under the forward ends between formers B-1 and B-2. These

(*Turn to page 66*)

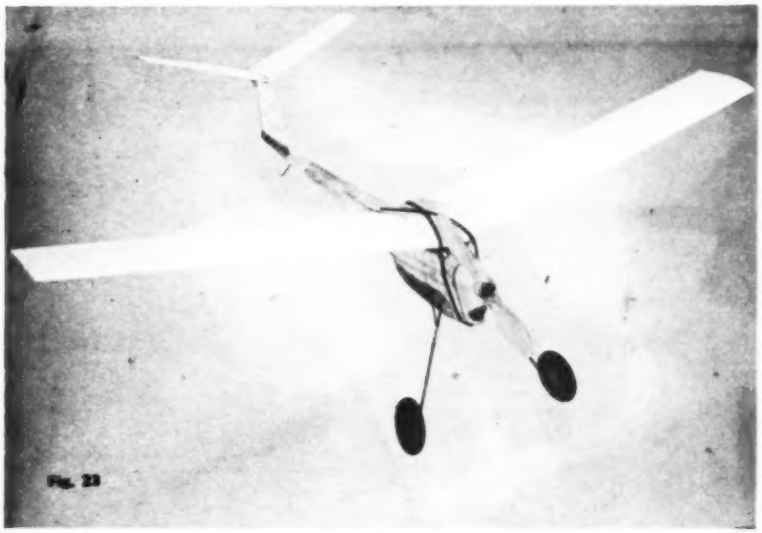
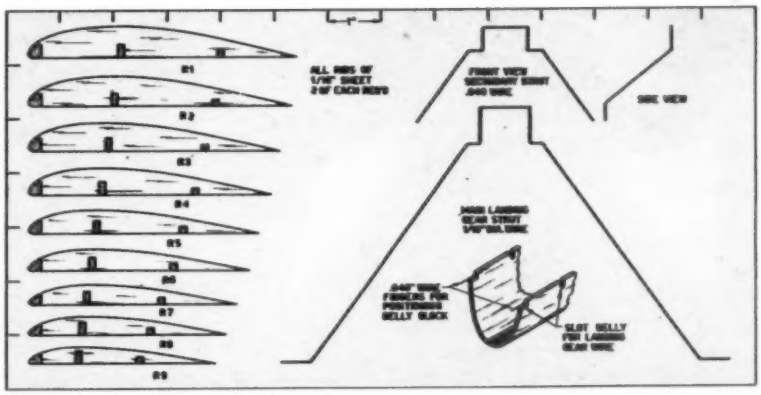
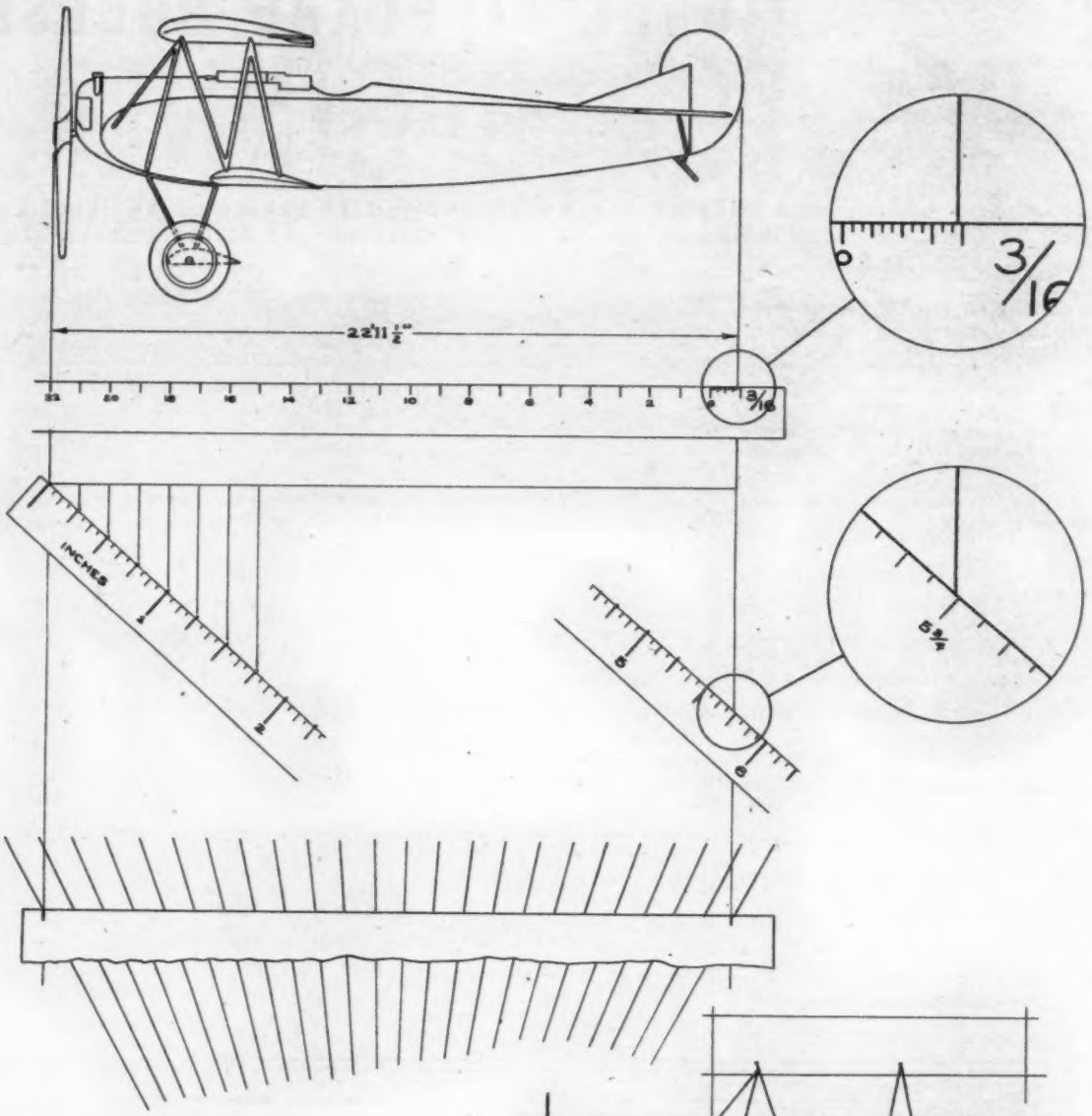


Fig. 23




22'11 1/2"
3/16
INCHES
5 3/4

SCALING PLANS

PART TWO

by PETER M. BOWERS

AS mentioned in part I of this article last issue, it is seldom that the three view drawings of airplanes appearing in the general aviation press are presented with the model builder in mind. While the drawings are to some scale, it is usually not one that falls within the standard range included in the architect's scale ruler, and is therefore difficult to redraw to a standard scale with ordinary equipment. It is necessary for the model builder, then, to establish the scale of the drawing himself, and to make a scale that can be used for enlarging the plan to the desired size. If the model is to be built to a certain size, for example, 20" wingspan, the scaling of the original drawing is unnecessary, and enlargement can be made by any of the direct methods described in part I. For the builder who likes to have all his models in proportion to one another, however, building to a standard scale is the only way, the most popular scale being ¼ inch to the foot for solids, and ½ or ¾ inch to the foot for flying scales.

To establish the scale of a three view drawing of any airplane, it is necessary to know at least one dimension of that plane. This is not usually hard to find because specifications — which include such measurements as length, height and wingspan—accompany most of the drawings that appear in aviation books and magazines. When the scale of the drawing is not given and some dimension such as the length is known, try the various scales on the architect's scale, which is a three-sided ruler graduated on one edge in the standard inches and sixteenths, and on the other edges in fractions of inches. Some of these scales read from left to right; others, either halves or doubles of the left-right scales, read from right to left. On the standard rule, for instance, the scale of eighths of an inch reads from the left, while the scale of quarters reads from the right, using every other eighth as one unit in the quarter scale. The same is true of the 3/32 and 3/16 scales and so on.

The drawing illustrates the use of the 3/16 scale on a side view drawing of the Fokker D-7, which has been drawn to a scale of exactly 3/16 inch to the foot for purposes of illustration. Length of this plane is 22 ft. 11½ in., and the 3/16 scale is drawn right under the side view to show how this dimension is read off. Notice that this scale reads right to left, just as it does on the actual architect's scale. For simplicity's sake, the left-to-right scale of 3/32 inch has been omitted. There is one unit located to the right of the zero mark, which is subdivided into 12 equal parts, the only one on the scale so divided. This is shown in an enlarged section in the projected circle. The 12 subdivisions of this unit are used to read inches of the dimension being scaled, while the undivided units indicate the feet. To read the dimension of 22 ft. 11½ in., set the 22 unit of the scale (corresponding to the number of feet in the dimension) at one end of it, and notice that the other end of the dimension falls beyond the zero mark on the scale, but within the subdivided unit, where the inches are read off. Since only inches are indicated, any fractions will have to be approximated by visual means, the half inch in this case being easy as it centers itself in the last inch-unit to the right of the zero.

When no standard scales fit the drawing it becomes necessary to make one, which is not as hard as it sounds. Actually, all there is to it is to divide some given dimension into an equal number of parts that correspond to its indicated length in feet.

The simplest and most widely used method of subdividing the dimension, since it requires no equipment other than a regular ruler and a draftsman's right angle triangle, is the diagonal ruler method. Transfer the given dimension to the edge of a sheet of paper, which is easily done by laying the straight edge of the paper along the dimension and marking the ends on the paper with a pencil. Project one end of this dimension across the paper by means of the right angle triangle, which insures its being at right angles to the edge of the paper. Lay the ruler over the dimension, and select some unit that is slightly larger than the unit into which the dimension is to be divided. In the case of the drawing shown here, every third 1/16 mark on the ruler will coincide with the final unit, since the drawing is to a scale of 3/16 inch to the foot. For purposes of illustration then, since we are trying to establish a scale instead of using one that the drawing happens to fit, we will use ¼ inch as our oversize unit. To determine which unit is the best to use, count the various ones when the ruler is laid along the dimension. As long as the number of units equivalent to the number of feet in the dimension to be scaled exceeds the total length of that dimension, the unit selected can be used. If the number of trial units falls within the dimension, the units are too small; if they coincide with it, you have luckily found a scale that fits.

Since the sample dimension to be divided is practically 23 ft. count off 23 quarters of an inch on the ruler, which gives a reading of 5-3/4 in. Since our dimension is actually 1/2 in. under 23 ft., we have to allow for it. With each 1/4 in. on the ruler representing one foot on the actual plane, each 1/16 in. unit represents 3 in. One-half inch, then, is 1/6 of 1/16 in. This is fairly easy to approximate by eye to as accurate a degree as one can draw to this scale with a pencil. With the zero point of the ruler set opposite one end of the dimension, rotate the ruler about this point until the 5-3/4 in. mark comes to rest on the line that has been projected across the paper from the other end of the dimension. Since we have that 1/2 in. to consider, back the ruler up so that the projected line intersects its edge 1/6 of the way from the 5-3/4 in. mark to the preceding 1/16 in. mark.

To save space on the drawing, the ruler has been broken, but the angle of rotation, the zero point, and the intersection with the projected line are all shown, with an enlargement of the latter for clarity. With the ruler held tightly in this position, make a sharp pencil mark opposite each 1/4 in. mark on the ruler; then, using the right angle triangle, drop perpendiculars from the edge of the paper to these points. The spacing of the perpendiculars will be the scale of the drawing in feet. It is convenient to use the same piece of paper on which the scale was established as the scale for enlarging the drawing. Number the perpendiculars, and by means of a compass or another piece of paper transfer one of the units to the opposite side of the zero mark on the scale thus formed, and subdivide it into at least 4 equal parts (or 12 if you can draw that accurately) for use as the inch scale, similar to the previously illustrated unit on the 3/16 scale. This can be done again by the digonal ruler method, or with practice, by eye, especially if only 4 divisions are made. On very small drawings, small units can neither be read accurately from a scale nor marked with a pencil, so subdivision of the end unit by eye is as good a method as any.

A variation of the diagonal ruler method—and one that is very handy if one makes a practice of subdividing various dimensions—is the "fan" method illustrated. Using any convenient unit, subdivide a straight line and draw lines from the division points to a projection of the midpoint of the line which has been placed approximately one line's length away. Whenever it becomes necessary to subdivide a dimension, mark it on the edge of a straight piece of paper; then slide the paper up and down the fan until the limits of the dimension coincide with one edge of the fan and the number of the line that corresponds to the number of units into which the dimension is to be divided. Be sure that the paper is at right angles to the centerline of the fan, or the divisions will be unequal. When the proper position of the paper has been found, mark its edge with a pencil opposite each of the lines of the fan that fall between the two end marks, and the dimension is divided. Fractions are taken care of either by drawing a supplementary line to one side or the other of the foot-unit lines of the fan in the proper spacing, or by approximating the distance between the end of the dimension and the end line of the fan.

Enlarging the three view by the use of scales is very similar to the graph method

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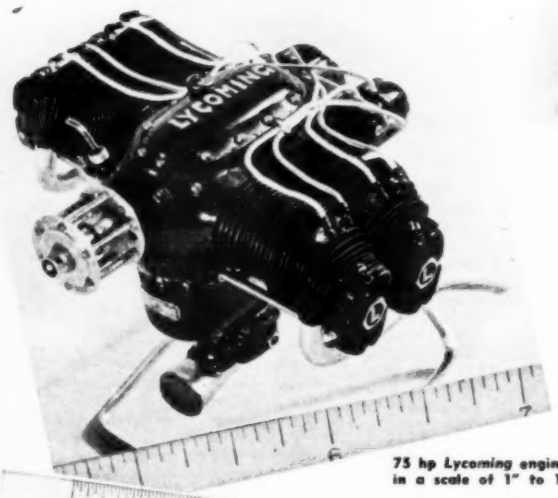
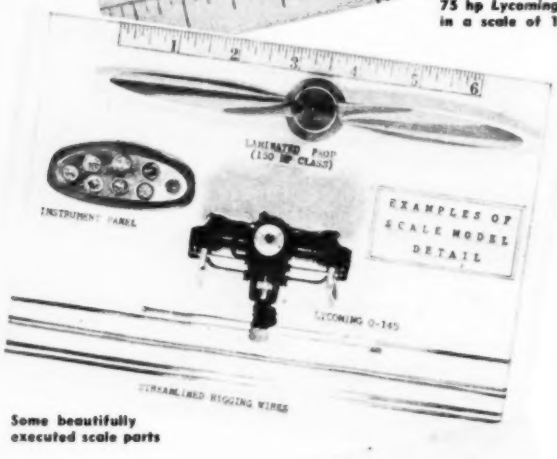
DUPLICATE
The Detail . . .

Detailed *Cirrus* engine installation in model of Great Lakes 2T-1A



75 hp Lycoming engine in a scale of 1" to 1'



Some beautifully executed scale parts

Another view of the *Cirrus* motor. Note screw and screen details

by **FREDERICK K. HOWARD**

THE detailed scale model is perhaps the best example of precise craftsmanship in the model airplane field. Although this type offers considerable latitude in method, materials and scale, the limit imposed by the purpose of the model—exact duplication in miniature of the full sized aircraft—necessitates craftsmanship unsurpassed in any other model type.

Precise craftsmanship is particularly important in the treatment of the many intricate external features designed to represent the visible details of the completed scale model apart from the basic structure, and including scale model engines, cabin or cockpit interiors, rigging wires, riveted surfaces, retractable landing gears, etc. The treatment of this type of feature either contributes to or detracts from the model's overall effectiveness and accuracy.

Realism is dependent not only upon accuracy but also on the method and materials used. As is the case in all scale model work, the details can rarely be built with the identical method and material used on the actual aircraft. Substitute methods and materials are usually required, and since most details are clearly visible the degree of realism resulting depends on the method of representation. When details are handled in an unrealistic way, the effect can hardly be expected to be realistic.

Many scale model builders either lack the facilities or find it impractical to duplicate accurately to scale each minute detail. So they adopt the practical policy of: (1) duplicating to scale as many of the features as seems reasonable; (2) substituting some technique or material for other details with the hope of getting at least the proper effect (for example, use of thread for streamlined wire or for the fins on aircooled engine cylinders); and (3) sometimes ignoring other details which they decide are unimportant. The omission of details is one sure way of turning a detailed scale model into simply another solid scale model if carried very far and can hardly be recommended. Scale model details are not "accessories" that may or may not be included in the model.

In scale model work, then, attempts at representing detailed features are characterized by one of two methods: (1) the detailed feature is accurately duplicated to scale on the model; or (2) the detailed feature as it appears on the model is intended to suggest the corresponding feature of the aircraft. Each of these methods of handling detail is found on many scale models and each has its limitations. A good example of the method of suggestion is the scale treatment of rivet heads by utilizing miniature appropriately spaced indentations formed from the inside of the sheet aluminum covering. (See "Metal Covered Models" in June 1946 *Model Airplane News* for a discussion of this method.) This treatment of rivet detail suggests a riveted surface and the

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On the Spot Report of EAST-WEST CHALLENGE MEET!

By JOHNNY DAVIS

"Model Airplane News" Staff Reporter

EAST MET WEST on September 6-7 in St. Louis and never believe the "twain" didn't meet. The gallant Easterners were mowed down by their stronger foes, but no one ever put up a gamer fight.

Actually the issue was never really in doubt from the first day, but Easterners Bob Tucker and Ed Swenton stood out for their hard efforts to snag a high place. Lou Andrews was another very hardworking gentleman from "Down East," but all his hard work went for naught.

The Western juggernaut simply overpowered the hapless Easterners, gathering all 7 first places, taking 6 seconds, 3 third places, and managed to break 4 A.M.A. records while doing it.

Keith Storey started the record runs Sunday with his class V *McCoy 49* powered speedster, turning 128.57 mph for his fourth time to hold this class record. Previously during the meet, on Saturday, he had turned down a run of approximately 127 mph on another flight because "he thought he could do better."

Some of the winners at East-West Meet. Standing, (left to right) Conrad, Anderson, McBrayer, Storey, Mathews. Kneeling — Tucker, Kitchen & Allen, Lansberg & Gulotta. All are from California except Tucker, who was in Precision Event.

Next, the boys everybody overlooked—the "little squirts"—went into action. In quick order Bud Jamieson with his *Arden .099* and Mal Anderson with his homemade *Tornado .19* broke the existing records for I and II respectively. Bud turned 74.38 mph and Mal 92.40 mph.

Keith Conrad turned around about four hours later and broke Bud's class I record again, doing 75.56 mph for a new Senior mark.

As if this weren't enough, Les McBrayer tuned up his little *McCoy 29* ship *LesGo*, which was not allowed to enter because of the deadline on engines, and walked away with the class III open record at the amazingly high speed of 120.80 mph. This was over 8 mph faster than the previous record of 112.50 set at the 1947 Nationals by Keith Storey with his *McCoy 29* ship.

All in all, it was one of the best regulated meets these eyes have seen in a long time.

The Greater St. Louis Modeler's Association certainly put on a real show and deserve all kinds of credit. Al Yount (President of the Club), Don White who was the hardest working man at the meet, Bill Simmler and his crew of judges and timers, Ken Willard at the microphone, and "Pop" Eldring, the contest director, all deserve a tremendous amount of credit.

To give some idea of just what went on we will list the schedule of activities.

On Friday night the two teams met and were welcomed to St. Louis by Al Yount on behalf of the St. Louis Modelers. Al then turned the meet over to Pop Eldring who proceeded to pass out entry blanks, and a discussion of rules followed, the main points being settled as follows:

SPEED

1. 20 g pull test okayed.
2. Three laps on pylon before official timing could start at discretion of pilot or helper.
3. 10 ft. maximum altitude during official timing.
4. 100th second watches to be used.
5. All timers to be St. Louis boys.

After the discussion of speed rules Ken Aymar, California's number one precision judge conducted a short briefing and schooling of judges, together with the discussion by both easterners and westerners as to which maneuvers were to be used and the points for each. These were:

Take off.
Level Flight.
Vertical Climb.
Vertical Dive.
Wing over.
Inside loop (up to 5 consec.).
Inverted level flight (2 laps).
Outside loops (up to 5 consec.).
Pair of Spectacles.
Horizontal eight (up to 3 consec.).
Inside square loop.
Landing.

An additional flight for novelty only allowed up to 30 points.

The meeting broke up at 12:30 and everybody turned in (almost). At 8 the following morning the contest started. The field was really laid out well, with three circles, speed on either end and stunt in the middle. Four microphones were scattered around where the officials could pick up as needed and not have to holler clear across the field, and plenty of runners were on the spot to take contest ships around.

There were always enough judges and timers around so that a contestant could walk right up and fly without a lot of red tape.

Flying continued all that day and until 12 that night. Actual flying was desultory as everybody was figuring out the weather and trying to get everything right.

Next day, Sunday, the meet got under way at 10 a.m. and the last flight was made at 11:30 that night to close the contest. So all in all there were 29½ hours of flying in 39½ hours elapsed time. No wonder everybody looked glassy eyed.

Everyone went home happy, though, because the meet was run under ideal conditions. True sportsmanship prevailed all the

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WEST COAST TIPS

by JOHNNY DAVIS

THIS year's Nationals left much to be desired in the minds of most of the boys whom we were able to contact. It may be due in part to the fact that the "Nats" was held right after the really bang-up "Plymouth International" meet. There was nothing but praise for the Detroit meet, which was financed by a real honest-to-goodness war chest of around $70,000 (besides local auto dealers' outlay). Probably the Nats, too, would have looked pretty good toting that kind of dough around.

Nevertheless, the Nationals always means big names and strange happenings, and there is always an aura about the Nats that just doesn't show anywhere else.

We were fortunate enough to travel on the Ohlsson & Rice express, so the long ride didn't seem so far. (That is, until we tried to land at Monticello Airport. Monticello Airport—that's the definition of a corduroy road—king-size!)

The first night we were there, Sunday, the poor boys in tent city almost got washed into the Mississippi River, and ditto Monday night. Tuesday night was little better; and then that ole debbil Sun got in his innings. By Thursday you could cut the heat with a knife—and Friday, in the indoor site at the Minnesota University field house, it was 142° in the rafters, and we can get an affidavit to prove it. Of course it was only 114° on the floor. It's a wonder those indoor jobs ever came down at all.

The Lockheed Club in better days. Included in this picture are most of the Lockheed boys together with the Army-sponsord Santa Ana Air Base Model Club

Names and Faces

Here are some of the Westerners visioned briefly at the 1947 Nationals. Incidentally, it looked like we were back at the Western Open instead of Minneapolis, there were so many of them.

Big dogs—J. C. Yates and Don Gulotta, doing a little pre-contest flying, had many contestants and spectators agog as they casually wrung out their ships Monday evening. They had everybody, including ye old editor "Madman" McEntee, hanging on the ropes. Then little 15 year old Jack Gilroy went up and outshone both of them with his new ship.

While this was going on in one corner, Bud Jamieson cranked up his little stunt job over on the other side and had a loop-fest of his own. A very proud, if not to say interested, spectator was "Hank" Orwick whose engines these boys were running. Henry made the long trip just to make any emergency repairs that might come up, which is really backing his boys. Also in the background was Mr. Jamieson, Bud's dad, who drove his boy back to make the meet.

Sitting in the middle of tent city were Wally Wallick, Bob Van Natta, Bob Thomas and Jim Whitlatch, poring over their hot jobs and whittling props.

While all these control line bugs—or "yo-yo boys" as the "flea-fliters" call them—were getting their gow jobs going, we noticed similar activity taking place over in the *Thermal Thumbers* camp. Except for one member, the team was really practicing. But where was Lopez? William "Indian" Lopez was missing.

Davey Slagle and his mom and pop were very much in evidence. And they really had a bag of tricks. Davey had so many gadgets on his airplanes that it was the wonder of the meet how he managed to keep them separated in his mind.

Everywhere we turned we ran into Bill Tharp, Art Wells and Allan Trainor. These boys were three of the busiest at the meet. They were entered in practically every free flight gas and rubber event.

We had a good example of why so many free flight boys are converts to control line when Yugi Hirose, a *Thermal Thumber*, started launching his models quartering the wind. In something under 12 seconds he had nothing left of a beautiful A job but toothpicks. As if that weren't enough, his free-wheeling folding prop kept folding back on the wrong side of his stick job and caused the ship to spiral down after the rubber had unwound. In each flight his model was high enough to really catch thermals, but Lady Luck looked the other way.

Little Georgie Yamamoto had a tough time, too, after having cleaned up at the Western Open. Everything he tried went the wrong way.

And guess who was also running into "bad luck"? Frank Cummings reminds us of a certain West Coast college football coach who always cries: "Everything I do is wrong . . . we haven't got a chance," and still brings home the bacon, time after time. Frank was actually timing other models and giving up on Monday (or so he said), nothing going right, all his indoor jobs ruined—poor guy, he just didn't have a chance. But look who turned up with the Sweepstakes *Cup* on Friday. Ah, that's our boy Cummings!

Keith Storey and Les McBrayer finally drove in and started making like they wanted to go fast along about Monday afternoon. Incidentally, Keith established some sort of record for doing the least amount of flying for any West Coaster we saw. He flew his Class III job once and set a new record; then flew his Class V speedster and set another record. He didn't fly but once after that, and the last flight was a last-minute attempt to break his Class III record.

Les had a little run of bad luck, but that little McCoy job of his is really hot. He is very apt to beat Keith at any time. He was flying the ship for its first test flight back there so actually getting a third with a rich engine run isn't bad at all.

Al Allan and Joe Kitchens really look like champs. They have won six straight good-sized contests including the Western Open, Detroit Internationals, and the Minneapolis Nationals. They started to give the boys trouble in Class V, too, at the Nats. They came in second to Keith Storey in that event as well as winning the Class VI event.

Another youngster who will make the boys holler for help in another year or so is Parker Hubert, the 16 year old Junior Speed champ. Parker is hitting about 115.5 mph as of the Nats, and for a junior contestant that is really picking them up and laying them down.

Wally Wallick and Bob Van Natta were certainly the hardest working guys of the meet. They had every kind of trouble imaginable, and when they finally had it

(*Turn to page* 36)

licked, for some unknown reason they lost the unbelievable amount of 20 miles an hour in the space of processing and waiting to fly.

Don Newberger and Wayne Leasure had an ice box full of pop and were really passing out Southern hospitality to one and all. We managed to snag a couple as the crowd milled around. Thanks, fellers!

WESTERNERS' RESULTS — Incomplete but best we can remember.

Frank Cummings—won the whole darn thing, by cracky.

Keith Storey—placed third to Frank in Sweepstakes and set two new records: control line, Class III, and Class V—both McCoy 29 and McCoy 49.

Al Allen and Joe Kitchens—set new record of the week before and won Class VI. Placed second Class V. Dooling 61 and McCoy 49.

Bill Tharp—won senior Stout outdoor event, placed in two others.

Parker Hubert—winner Class VI Junior Speed. New record. McCoy 60 powered.

Don Gulotta—Senior Precision winner. Second to Davey Slagle for National Honors. Orwick powered.

Davey Slagle—Winner Junior Precision, and Jim Walker Trophy for National Champ. Orwick powered.

J. C. Yates—placed second in Open Stunt, Orwick powered (we wuz robbed!)

Gee whiz, fellows, we gotta stop somewhere, we haven't had any sleep yet. If we missed anybody, and we will give odds we missed a lot, they will be in next month's column. And we mean you, *Thermal Thumbers!*

Sopwith Triplane

(*Continued from page 17*)

facilitate the pilot's ingress and egress from his machine. The upper wing center-section is made separately. Do not neglect to allow for the slots in the wings as shown on the plans as they are important in the final assembly. The wings are covered with Silkspan and given three coats of clear dope and colored buff. The slots mentioned previously are left uncovered.

Interplane struts are cut from 1/8" plywood following the template on the plan. These are well sanded and colored olive drab. The lower wing can now be cemented in place. It will align itself in both dihedral and incidence because of the plywood joiners. When this is dry the interplane strut is cemented into the slot in the lower wing, and the intermediate wing is then added by sliding it over the strut. While this is drying, the centersection can be mounted in the same manner. Final assembly is the addition of the upper wing panels. This system of assembly has given satisfactory results in both self-alignment and strength.

The model is completed with the addition of fuselage and wing cocards and, if the builder so desires, heavy thread can be used to simulate flying and landing wires. One or two Vickers machine guns may be added. These can be made of scrap balsa and dowel. Wheel hubs can be colored light blue.

As with all control liners, this model should balance on the forward control wire. A control line guide made of 1/16" plywood with two holes 1-1/4" apart should be cemented to interplane strut.

A few pointers on control line flying may help the inexperienced flier. Never use control lines of a lighter gauge than specified by the A.M.A. rules for the class of engine used. The author used .012" diameter stainless steel wire. Always start the takeoff downwind to gain sufficient speed to become airborne. When stunting, do not loop when the model is flying into the wind, and do not stunt until you are thoroughly familiar with your model's characteristics. Care should be taken to eliminate slack in the control lines; loss of tension means loss of control. The rudder should be offset to turn the plane away from the center of the circle. However, if slack does occur at any time, a step or two backward should remedy the situation.

If the plans are followed and the model is built with care and flown with good sense, it will be the main attraction on any flying field. Happy Landings!

Results of East-West Challenge Meet

(*Continued from page 33*)

way. There was not a single squawk or protest raised during the entire meet. All that resulted was a general interchange of ideas and good fellowship.

The meet did much to further the control line game and may have far-reaching repercussions in next year's rules as both the East and West okayed the rules about the same as outlined here. Also, the leading stunt men got their heads together and looked ahead to next year's Nationals in setting up the rules for this meet.

Three cheers for the East-West Challenge Meet!

RESULTS

(E-East; W-West)

Class I

1. Keith Conrad (W)	Arden .099	75.56 (Record)
2. Bud Jamieson (W)	Arden .099	74.38
3. Roy Gregson (W)	Arden .099	72.00

Class II

1. Mal Anderson (W)	Tornado 19	92.40 (Record)
2. Bud Jamieson (W)	Arden .199	87.20
3. Ed Kroll (W)	Ohlsson 19	85.67

Class III

1. Les McBrayer (W)	K&B Torpedo	108.43
2. Mal Anderson (W)	Tornado 29	101.12
3. Pete Geiser (E)	K&B Torpedo	89.02

Class IV

1. Mal Anderson (W)	Tornado 39	88.71
2. Keith Conrad (W)	Vivell 35	77.92
3. Resh (E)	Cannon 358	73.32

Class V

1. Keith H. Storey (W)	McCoy 49	128.57 (Record)
2. C. Wayne Matthews (W)	McCoy 49	122.86
3. Allen & Kitchens (W)	McCoy 49	117.63

Class VI

1. C. Wayne Matthews (W)	Hornet	126.13
2. Ed Swenton (E)	Hassad	124.22
3. Bill Seidler (E)	Hornet	118.96

Precision Stunt

1. Ed Lansberg (W) 3. Bob Tucker (E)
2. Don Gulotta (W) 4. Bud Jamieson (W)

Record flight by Les McBrayer with McCoy 29 successful: Official time 120.80 mph—New AMA Class III Open Record.

ALSO RAN:

Class I

4th	Mal Anderson (W)	68.70
5th	Charles Lee (E)	65.02
6th	Ernie Babcock (E)	64.28

Class V

4th	Bascom (E)	107.65
5th	Pete Geiser (E)	104.65

Class II

4th	Roy Gregson (W)	82.64
5th	Ernie Babcock (E)	82.26
6th	Les McBrayer (W)	72.77

Class VI

4th	Ernie Babcock (E)	113.70
5th	Pete Geiser (E)	105.20

See December issue for more photos taken by our Staff Photographer at the East-West Challenge Meet in St. Louis.

Free Flight vs. Controline

(*Continued from page* 12)

ROG rubber models and cabin type rubber models, leading to simple gas designs, means a good basic training in structures, aerodynamics and stability.

2. Development of adjusting skill for free flight performance yields a feeling of personal achievement in creating a model which will perform unaided according to predetermined requirements.

3. Experimental models can be used to predict the stability characteristics of unorthodox designs.

DIFFICULTIES:

1. Flight area must be large.

2. Mishaps due to lack of control in the air are more frequent.

3. Out-of-sight flights means lost models, an expensive item when gas motors are involved.

4. Adjustments for proper flight are more critical and may discourage potential newcomers.

Now let's list some of the points regarding controliners:

ADVANTAGES:

1. Limited space is all that is necessary for flying.

2. Control lines permit flying in a fresh wind without too much danger of crackup.

3. Wide margin of error permissible in adjustment means that even the novice can be successful with a high performance model.

4. Control permits of attempting maneuvers in precision aerobatic flying for spectacular exhibitions.

DISADVANTAGES:

1. High speed on controlines means potential danger for spectators in restricted areas.

2. Control lines are frequently getting fouled or tangled with the feet of unthinking onlookers.

3. No educational development on stability other than limits of travel on the elevators.

4. Engine noise in restricted areas leads to complaints by residents.

Those of you who have been embroiled in this argument for several years can probably think of many other items to be listed in the foregoing tabulation.

Now that we have the points in question, an analysis of the two types of flying will easily show why controline flying has taken the country by storm, leaving the free flighters very much a band of minority enthusiasts. Let's consider the matter technically, then commercially.

Technically, and I think the controline fans will agree, it is easier for a beginner to: (1) build and (2) fly a controline trainer type model than it is to: (1) build, (2) adjust and (3) fly a free flight gas model. The plans for a controline model can show the location of engine and accessories within the limits of weight of the rest of the model so that the elevators can handle any small variations resulting from different densities in the wood and paint jobs. Also, irregularities which a beginner is bound to have in constructing the wing are not critical for just the achievement of controlled flight. But, for the free flight model, even though the plans show location of weights, the structure will not always be properly aligned, nor will the weights be distributed absolutely right. Glide tests can establish the gliding stability, but there is still the power-on test to check the thrust, with unpremeditated upthrust and sidethrust just waiting to develop power stalls or spiral dives to the inevitable crash, which

can easily discourage the beginner who has not had a good basic training with gliders and rubber powered models.

However, to continue the presentation further, it does not follow that, once having achieved successful flight with a controliner, the requirements necessary to win speed races and aerobatic contests are easier than the refinements required to win free flight duration contests. On the contrary—and mind you, this is a free flight enthusiast speaking—it is my opinion that it requires more skill to advance into the winning column with controliners than it does with free flight, once you've mastered the elementary phases. Luck is far too important to the free flight contestant; give a dub a good thermal and he's number one in the prize listing. But the chap who can consistently make his engine and propeller combination pull maximum power will always win the speed contest, or at least be near the top; and the fellow who has practiced his inverted flying and outside loops and other maneuvers will always be a winner in the aerobatics—no dub is going to step in and win these contests with a lucky gust.

I don't agree necessarily with the experts who say that free flight develops stability to the neglect of engine and propeller combinations for maximum power, which the controliners improve. Back in 1939 I built a 5 ft. custom cabin Waco weighing 2½ lbs. It flew well with an *Ohlsson 23*. Fascinated with the prospect, I mounted an *Atom* in it and then proceeded to carve a series of propellers to see if I could make it work. Finally with an 11 in. diameter, 3.75" pitch prop with a thin blade, both in thickness and plan, I achieved a highly successful combination, and still have the movies showing the unassisted takeoffs, climbs and beautiful flight characterics which the Polk boys once watched in amazement. The performance couldn't be duplicated with any of the commercial props then available, and of course hot fuels were unheard of.

Similarly, I'll argue with the free flight boys who say that controline fans add nothing to the store of aerodynamic knowledge except more power means more speed. Take any high speed controliner and change the airfoil on the wing and you'll have a quick example of what I mean. Also, it's true that controliners don't have to have rudders, but a properly set rudder will help overcome centrifugal force at high speed and decrease the tension on the lines so that the plane flies more nearly in line with the thrust, with a consequent increase in speed due to decreased yaw.

To wind up the technical aspect of this discussion, then, it is my contention that although it is technically easier to start with a controliner, it takes more advancement in an individual's skill to win the top awards in speed and aerobatics. But it takes more aerodynamic knowledge to successfully design, build, adjust and fly a free flight model. The simple point is that the advancement in skill in each case goes off on a different slant; so if you think you are a good modeller you can't prove it until you can show results in both classes. And no model club can claim any distinction in my book until they start collecting prizes in free flight as well as controline.

Commercially, the answer appears obvious. It's the beginners that put volume into any hobby; and because the beginner has more chance with the controliner, it only took a few short years for this phase of modelling to completely dominate the

commercial aspect. It most certainly is true that the advantages of controline flying far outweigh the disadvantages when compared with the problems of free flight, so I look for controline flying to increase all out of proportion to the degree of pleasure and feeling of achievement which a free flight performance yields to the experienced modeller.

Radio control developments will increase free flight possibilities, but again only for the experts.

Then what can be done to revitalize free flight? The question "What's wrong with free flight?" has been discussed frequently, yet interest continues to decline. But let me quote a few experiences. I recently took a couple of free flight models to a local field where the boys are controline fans, started them up, flew them around several times, put them in the car and went home—after overhearing a couple of the other modellers say: "I think I'll try that idea. Those were nice flights, and the models didn't get too far away." The idea they are going to try is not new —it just doesn't seem to occur to modellers in these days of hot fuels, high compression, skyrocket climbs, and what have you.

I just take an *.099* engine, put it in what amounts to a class B model, and have nice flights up to about 100 ft. altitude and back down in a fairly flat glide. The wing loading is around 8 oz. per sq. ft. (slightly less than the 7 oz. per 100 sq. in. now required for AMA contests), but the power loading runs around 200 (yes, 200!) oz. per cu. in. motor displacement (compared to 80 oz. per cu. in. permitted by AMA). Underpowered? Maybe modern modellers may think so, but the takeoffs are beautiful to watch compared to sticking the tail on the ground, the nose straight up, and letting the model helicopter into the air with the wing as an antitorque surface. And I've never lost one of these "underpowered" models. I competed in two contests in 1940, with two out-of-sight flights losing $50 in engines and accessories, and I decided to quit contests until they got some sense. That was when I really started building big models with little motors exclusively. And if you think it's easy, try it—because it is, once you get the hang of it.

Little motors for larger models will do a lot to rejuvenate free flight modelling. The new CO2 engine should really help a lot. Now there's a challenge! Why not introduce a contest for CO2 powered models? The power source is the same for everyone, and the modeller who achieves the most efficient model won't have to listen to alibis like "My fuel mixture was bad," or "My ignition came loose."

Here's another suggestion to some smart manufacturer. I've got a very crude compression ignition engine which I picked up in France but which runs better than any American engine on the market today, yet it has a bore and stroke smaller than the *Mite*. When I say crude, I mean that it is not designed to minimum weight; the tolerances in the cylinder are very close. But this motor, using proven American production methods, could be put out with a total weight of less than 2 oz. Swinging a 7" propeller, it would be suitable for 2½ ft. free flight models which wouldn't need such large areas for safe flying. And it is almost noiseless compared to other motors. I believe that a really reliable tiny compression ignition engine could put real volume into small free flight kits. It would diminish the effects of the disadvantages of free flight models and encourage more modellers to

have a try at this fascinating phase.

And what can be done to introduce problems of stability in controline flying? Easy—make each model perform at least once as a free flighter! I can see murder in the eyes of the controliners—but wait until I've finished. Have two models of the same design but with different wing and power loadings—maybe the free flight model could be rubberpowered. It's only an idea, but at least it would keep some of the monstrosities which pass for controline planes from appearing in bonafide contests.

There's been a lot of talk about reclassifying free flight contests in conformance with the controline power classifications. That's a logical step in view of the engine developments of late, but equally as logical would be increasing the power loading to conform to the increased efficiency of today's motors. The figure of 120 oz. per cu. in. displacement has been mentioned, but this will not cut the ice. Hot fuels can just about overcome the increase of 40 oz. per cu. in. For all weather contests I am willing to admit that 200 oz. per cu. in. makes the flight critical under conditions of strong wind, but I don't feel that 150 or 160 oz. per cu. in. would be too much. This loading, with a 15 sec. engine run, would present some real design problems for the free flight boys, not only in wing and tail groupings but in the field of propeller performance as well.

So I say, let's alter the free flight requirements to permit contests without those out-of-sight flights, and include some of the events we used to have like weight carrying, precision flights, parachute drops, and others wherein the modeller's knowledge of his plane's performance will yield higher dividends; and let's alter the controline contests so that free flight prototypes of the contesting models must demonstrate inherent stability. Finally, let's take a page from the British contest rulebook and do away with precontest weighings and specification checks, except of course the line check on the controline strength. No modeller who has any chance of winning could afford to disregard the established minimums, and the simplification resulting would make contests immeasurably easier to conduct. Only a check on the winning models would be required.

Well, these are a few ideas from a guy who left before all this big ruckus about free flight and controline began, and came back to find dissension in the ranks of modellers beginning to hinder the real enjoyment of flying model airplanes, a scientific hobby unequalled in the instruction it offers and the pleasure it yields. I for one will argue—pleasantly—for either phase of modelling, and I'll bet Leon Shulman, Carl Goldberg, Don Newberger, Sal Taibi, et al will concur. Or you might ask that "grand old man" of modelling, Charlie Grant (who really isn't *that* old, but has been modelling for lo, these many years) and even Jim Walker, "daddy control" himself.

So, you newcomers to aeromodelling, take a tip from the oldtimers. You're missing some real thrills and fun unless you try *both* free flight and controline flying.

PHOTO CREDITS

Page		
2	*Above*	British Combine
	Below	Press Assoc.
9, 10, 11	*All*	Model Airplane News (Ernie Petry)
15	*All*	Goodyear Aircraft
27	*All*	Robert C. Hare
32	*All*	Cloyd Teeter

Air Ways

(*Continued from page 21*)

wood *Champion* with a four blade prop. Originally it had 7-1/2 ft. wingspan, but crackups have lessened this to 6 ft. Stanley Jamieson helped build the ship and is the launcher, but the ship can take off on its own gear. It is built of a combination of balsa, pine, rubberbands, and bailing wire and has turned in many flights.

No. 6 shows Ronald J. P. Thomas, 18 Abbeyhills Road, Oldham, Lancs., England with his *Prelude*. This sailplane of original design has 58" span, 6" constant chord, inverted tear drop body section, wing section Gott. 532, wing area 330 sq. in., level flying speed 20 mph, weight 1 lb. 10 oz., wing loading 11.3 oz. sq. ft. Two test flights showed a real flat glide and good stability, but both flights ended in collisions. Mr. Thomas founded a Model Aircraft Club in Oldham in 1945 and the members are mainly interested in flying sailplanes and indoor round-the-pole models.

Ben Furst, 880-8 Stuyvesant Ave., Irvington 11, N.J. sent in No. 7 of his *Swami*, powered by an *Ohlsson 23* and built from plans in July 1944 M.A.N. The model was covered with orange paper and trimmed in blue. Ben was only able to fly it seven times because the last flight was in a high wind—the picture was obviously taken after the seventh flight.

The fine photo in No. 8 was submitted by Leonard E. Opdycke, Bar Harbor, Me. It shows his *Ohlsson 19* powered Supermarine *Walrus* which he has just completed. He writes that it made a complicated model but one of the most interesting he has yet built.

Halvande Lande, Tiedemannsgt, Kongsberg, Norway sent in No. 9 of his Wakefield model which is a very good flier. He writes that the many mountains in Norway make it difficult for him to find a place to fly it. Wingspan is 1.15 meters. Several models were started during the war and finished when balsa and rubber became available.

No. 10 was sent in by Norman Kossuth, 86 Cedarhurst, Detroit 3, Mich. The photo shows a flying model of the Hiller XH-44 helicopter, revised version, built to a 3/4" equals 1' scale and designed with the aid of blueprints furnished by United Helicopters, Inc. Rotor diameter on the model is 21 in. The ship climbs quite rapidly in flight. Norman writes that he would like to see more interest in model helicopters.

No. 11 shows a Lockheed Model 14 built by Gene Morava, 225 S. Matthisen Ave., Compton, Calif. and built from Wylam's three view of the Lockheed *Hudson*. This model has a 5-1/2 ft. wingspan, is painted silver with blue trim, and is completely balsa covered. The fuselage was made in four pieces following the keel and former method. The cabin is painted a two tone green and has 13 green upholstered seats with safety belts, green curtains and a green carpet. The pilot's compartment is fully detailed including two brown leather seats. The engines were built up and the nacelles are of keel and former construction.

No. 12, by Lawrence Lammens, 4 Marche aux Grains, Ghent, Belgium, shows his latest control line job which recently won a contest between members of the Ghent Recreation Air. Lawrence writes that it is a wonderful stunt flyer and is covered all over with balsa sheets; the engine is a 2.8 Micron diesel. He reports that aeromodelling is now in full swing again in Belgium. The Belgian team recently won the big international contest in Zurich, Switzerland.

BIG NEWS FOR MODEL BUILDERS

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NEWS OF MODELERS

Joaquin G. Ramos, Calle 63 No. 4F2, Merida, Yucatan, Mexico writes that modeling in Yucatan is difficult due to the shortage of materials. Material is also highly overpriced. He writes that a *Thor* engine sells for $150!

Trevor R. Berg, 9 Portia St., Stratford, Taranaki, N. Zealand, desires to correspond with a girl who is about 17 years old and interested in model building.

Fernando J. Rueda, San Luis 394, Posadas, Misiones, Argentina would like to hear from Ted Hindmarsh. They had just begun an interesting correspondence on modeling (started through M.A.N.) when he lost Ted's address.

CLUB NEWS

California

San Francisco Recreation Department's *The Third Dimension* reports the 21st Annual Recreation Model Aircraft Tournament on Oct. 5 was open to playground girls and boys (junior and senior division) residing in San Francisco. Events included hand-launched glider, towline glider, and R.O.G. rubber powered cabin. AMA rules applied.

* *

The *Aeroneer* reports the 5th Gas Hydro Meet held at Lake Merced on June 8. The contest was put on by *San Francisco Vultures* sponsored by the San Francisco Exchange Club. Results:

High Time—1. Andy Tagliafico; 2. John Drobshoff; 3. Jack Dyer.
Junior—1. David Allen.

* *

Tom Engelman, Chairman, sent in the following results of the All Western Open Model Aircraft Meet held June 27-30 and sponsored by the Los Angeles Junior Chamber of Commerce.

Rubber Powered Stick

Junior—1. Darwin Thomas; 2. S. Greenhut; 3. John Whittemore.
Senior—1. Art Wells; 2. Thad Taft; 3. Don Kennedy.
Open—1. Carl A. Rambo; 2. Michael Demos; 3. Bob Baum.
Professional—1. Art Snyder; 2. Bill Atwood; 3. Frank Cummings.

Rubber Powered Cabin

Senior—1. Art Wells; 2. Bill Tharp.
Open—1. Michael Demos; 2. Carl G. Rambo.
Professional—1. Frank L. Cummings; 2. Don Donahue; 3. Andrew Peterson.

Hand Launched Glider

Junior—1. Barre Bodenlos; 2. Paul Oldershaw; 3. John Whittemore.
Senior—1. Art Wells; 2. Richard Campbell; 3. Charles Dorsett.
Open—1. Peter A. Demos; 2. Edward Slobod; 3. Michael G. Demos.
Professional—1. Bob Holland; 2. George Honda; 3. Bill Lopez.

Free Flight Gas Class A

Junior—1. Hal Yaeger; 2. Bobby North; 3. Al Rowen.
Senior—1. Leo Caton; 2. Allen Trainor; 3. Bob Glines.
Open—1. E. V. Wrisley; 2. Jack H. Douglas; 3. Russ Watkins.
Professional—1. Andrew Petersen; 2. Robert Sweger; 3. Robert Randolph.

Free Flight Gas Class B

Junior—1. Jason Hayward; 2. Owen Jacobsen; 3. Jack Butler.
Senior—1. Don R. James; 2. Bob Gunzel; 3. Allen Trainor.
Open—1. S. O. Clampitt; 2. P. J. Regan; 3. Bill Pogue.
Professional—1. Doug Merrill; 2. Hans H. Wall; 3. Davis Converse.

Free Flight Gas Class C

Junior—1. Jason Hayward; 2. Daryl Shephard; 3. Al Rowen.
Senior—1. Charles Dorsett; 2. Martin Smith, Jr.; 3. Ray Bowerman.
Open—1. Lester Regan; 2. Vern Flanders; 3. F. L. Swaney.
Professional—1. Ace Boultinghouse; 2. Frank Cummings; 3. Kenneth Brann.

Rubber Powered Stick

Junior—1. George Yamamoto.
Senior—1. George Matsumoto; 2. Bill Tharp; 3. Gerard McDonald.

Open—1. Manual Andrade; 2. Richard Schumaker; 3. Edward Slobod.
Professional—1. F. Cummings, Jr.; 2. Bob Holland; 3. Bill Atwood.

Rubber Powered Cabin

Junior—1. Barre Bodenlos; 2. Sheldon Greenhut; 3. George Yamamoto.
Senior—1. Donald Robbers; 2. Allen Trainor; 3. Charles Primbs.
Open—1. Andrew Petersen; 2. L. A. Schlagel; 3. Manuel Andrade.
Professional—1. Ralph B. Conn; 2. Frank Greene; 3. Andrew Petersen.

Hand Launched Glider

Junior—1. Jack Gilroy; 2. Barre J. Bodenlos; 3. Ronald Truelson.
Senior—1. Allen Trainor; 2. Al Lutz; 3. Alfred Schwartzlast.
Open—1. Harvey S. Robbers, Sr.; 2. Chalmer M. Cloyd; 3. Lihand Spaulding.
Professional—1. Frank Cummings; 2. L. J. Kading; 3. Don Donahue.

Towline Glider

Junior—1. George Yamamoto; 2. Barre J. Bodenlos; 3. G. F. Andrews.
Senior—1. Donald J. Robbers; 2. Leo Caton; 3. Roy Gregson.
Open—1. Ralph Obery; 2. Manuel Andrade; 3. Leland Spaulding.
Professional—1. Ralph B. Conn; 2. Joe Ofria; 3. Wm. G. Nickloff.

ROW Gas

Junior—1. Charles Ransom; 2. Jack Butler.
Senior—1. Andy Tagliafico; 2. Lew Mahieu; 3. Ronald St. Jean.
Open—1. Jack Dyer; 2. Joe Bilgri; 3. Russ Watkins.
Professional—1. Don Newberger; 2. Andrew Peterson; 3. Arthur C. Snyder.

Control Line Speed Class A

Junior—1. Paul Conrad.
Senior—1. Royce Childress; 2. Ted Pocock.
Open—1. W. E. Richards; 2. Art Shane.
Professional—1. Les McBrayer; 2. Troy A. Burris; 3. Newburger and Leasure.

Control Line Speed Class B

Junior—1. Robert Keech; 2. Ray Bendkin; 3. Al Wadleigh.
Senior—1. Jim Whitlatch; 2. Lew Mahieu; 3. Joe Carter.
Open—1. James McElroy; 2. Chuck Schlosser.
Professional—1. Bob Vanatta and W. Wallick; 2. Keith Storey; 3. Bill Bruffey.

Control Line Speed Class C

Junior—1. Richard Grandal; 2. Wm. McKerracher; 3. Al Wadleigh.
Senior—1. Donald W. Jones; 2. Jim Whitlach; 3. Bill Wisniewski.
Open—1. James McElroy; 2. H. M. Westermo; 3. Ray Schmidt.
Professional—1. Allan. Kitchens and Woodward; 2. Bob Thomas and Doug Doe; 3. Bob Vanetta and W. Wallick.

Acrobatics

Junior—1. Jack Gilroy; 2. Robert Keech; 3. Tom Dorey.
Senior—1. Don Gulatta; 2. Bob Brown; 3. K. L. Skilling.
Open—1. Garold Grymire; 2. Marjorie Hutcheon; 3. L. J. Varner.
Professional—1. J. C. Yates; 2. Jim Saftig; 3. Robert Palmer.
Team Stunt—1. Go Devils; 2. Snafu; 3. Feeble Eagles.
Flying Scale—1. Bucky Monroe.

Sweepstakes Winners

Junior—1. Barre J. Bodenlos; 2. George Yamamoto; 3. Jason Hayward.
Senior—1. Art Wells; 2. Allen Trainor; 3. Don Robbers.
Open—1. Manuel Andrade; 2. Michael Demos; 3. James McElroy.
Professional—1. Frank L. Cummings; 2. Andrew Petersen; 3. Bob Holland.

Special Awards

Champion Woman Contestant—Marjorie Hutcheon.
Standard Oil Awards for Junior Contestants
Fastest Speed Time—Bob Keech.
Longest Indoor Flight—Thomas Darwin.
Longest Endurance Flight—Jason Hayward.

"Ohlsson and Rice Express" Qualifiers
Open-Pro Winners

1. Frank Cummings, Jr.; 2. Ralph Conn; 3. Michael Demos; 4. J. C. Yates; 5. Wallick; 6. Andrew Petersen; 7. Manuel Andrade; 8. Don Newberger.

* *

Northern California Model News reports that the First Annual U-Control Contest held by the *Ukiah Modeleers* on Sept. 1 had events that included Speed, Precision, Team, Novelty and Flying Scale. A.M.A. of N.C. rules were used.

The *Palo Alto U-Liners* held a U-Con-

trol Contest in Palo Alto August 24. Events included A, B and C classes in Jr. and Sr. speed and A, B and C classes in Jr. and Sr. precision.

The Oakland Junior Chamber of Commerce held a U-Control Contest on the field adjoining the Civic Auditorium on August 10. Events included A, B and C classes in Jr. and Sr. Speed and A, B and C classes in Jr. and Sr. Precision.

Peninsula Prop Twisters of San Mateo held an all-precision contest on September 7 at the San Mateo City Park. Events included Jr. and Sr. in the three classes plus the open class events of Team, Flying Scale, Novelty and Women's.

A new U-Control Club known as *Sky Shark Speed Club* was recently formed in El Verano. This is a nall speed club and has 8 charter members. Dan Daneili was elected Business Mgr., Russ Lincoln, Sec'y-Treas., and Bob Watts, Librarian. The club flies every Sunday at the Boyes Springs ball park.

The officers and men of Camp Stoneman held their Second Annual Model Airplane Contest at Camp Stoneman on August 3 as a part of the celebration of the Fifth Anniversary of the Army Transportation Corps.

The San Francisco Junior Chamber of Commerce sponsored the Fourth Annual Model Airplane Meet held at the Polo Grounds September 13 and 14.

Do Little Flying Club and the Lions Club of Petaluma held their First Annual All Precision U-Control Model Airplane Contest on July 4 at Durst Field. Results were as follows:

Class A Jr. Precision—1. John Pedracci; 2. Don McMillan; 3. LeRoy Green.
Class B Jr. Precision—1. Don Butman; 2. John Pedracci; 3. Dave Bennett.
Class C Jr. Precision—1. Snuffy Duffy; 2. Don Butman; 3. Dave Bennett.
Class A Sr. Precision—1. Ray Regalia; 2. D. Hollfelder; 3. R. Griswold.
Class B Sr. Precision—1. K. Skilling; 2. R. Regalia; 3. B. King.
Class C Sr. Precision—1. C. Tyre; 2. J. Smith; 3. Bud Hooper.
Women's Event—1. Barbara Santina; 2. A. Puckett; 3. N. Pritchard.
Novelty—1. Lorne Duffy.
Team—1. Butman, Frazer, Vallejo; 2. King, Hodge, Eureka; 3. Learned, Learned, Ukiah.
Flying Scale—1. J. Smith; 2. R. Griswold; 3. W. Blue.
Inside Loop—1. Don Butman.
Outside Loop—None.
Club Sweepstake—Vallejo Sky Jockeys.

* *

The *F.G.M.A.C. News* reported on the qualifying meet for the First International Meet held by McAlisters Corp. of Fresno held on July 20. Results were:

Class A—1. Melvin Phillips; 2. D. Satterlee; 3. Jack Whitling.
Class B—1. Dutch Van Tassell; 2. Fred Mosier; 3. Luther Simonian.
Class C—1. Shuji Maruko; 2. Henry Vincent; 3. Amos Kleinsasser.
Outdoor Stick Rubber—1. Luther Simonian; 2. Shuji Maruko; 3. Rudy Lopez.
Outdoor Cabin Rubber—1. Suiki Mataga.

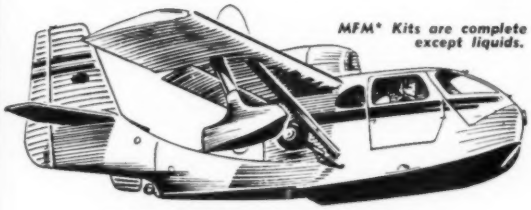
From John Lenderman, Pres., comes news of the U-Control Contest held by *Stockton Piston Pushers* at Stribley Park in Stockton on July 27. Results:

Precision Class A—1. R. Regalia; 2. D. Hollfelder; 3. John Pedracci.
Precision Class B—1. B. Thunberg; 2. A. Simms; 3. A. Bazurto.
Precision Class C—1. E. Kind; 2. R. Regalia; 3. J. Douglas.
Speed Class A—1. M. Anderson; 2. H. Hausske; 3. Whitlach.
Speed Class B—1. E. Huth; 2. Albrecht and Alexander; 3. C. Anguin.
Speed Class C—1. Albrecht and Alexander; 2. B. McKerracher; 3. D. Shelton.
James Smith won the Beauty Event with his World War I Spad. All of the ships in this event were required to fly at least two laps, and Smith demonstrated that his ship could fly as well as it looked.

Florida

Jimmie Green, Sec'y-Treas. of *Pensacola Prop Twisters*, writes that four club

No Matter What Your Taste in Models—



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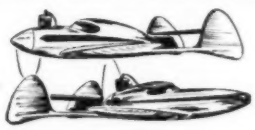

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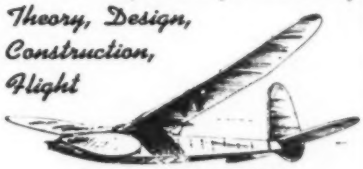

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members attended the 7th Annual Gulf States Model Airplane Meet in New Orleans August 1, 2, & 3 and won six first places and one 3rd place. The winners were:

1st place Class A Free Flight—Jimmie Green.
3rd place A Free Flight—Tommy Varnsen.
1st place B Free Flight—Jimmie Green.
1st place C Free Flight—Thomas McLaughlan.
1st place Class 5 U-Control—Tommy Varnsen.
1st place II U-Control—Sam Price.
1st place III U-Control—Sam Price.

Iowa

Wallace R. Blake, Director, sent in these results of the 1947 Tallcorn State Model Air Meet held July 4-5:

Class A Gas—1. B. Wright; 2. Val Sherrard; 3. Herb Breitinger.
Class B Gas Open—1. Calvin Boyd; 2. Ray Morris; 3. Bill Parmenter.
Class B Gas Senior—1. W. E. McFarland; 2. Bernard Kilger; 3. Maurice Pollock.
Class C Open—1. Bob Wright; 2. C. B. Russell; 3. Bill Parmenter.
Class C Gas Senior—1. Chuck Blumer; 2. Don Leapley; 3. Russ Booth.
Outdoor Fuselage Rubber Open—1. Wally Simmers; 2. Gail Flesher; 3. Ed Lidgard.
Senior Rubber—1. Stanley Yeager; 2. Herbert Kothe; 3. W. E. McFarland.
Junior Rubber—1. Marvin Fromm; 2. Bill Schwennen; 3. John J. Eige.
Handlaunch Glider—1. Durand Weiler; 2. John Spaulding; 3. Herbert Kothe.
CO_2 Event—1. Rolland Dexter; 2. Frank Garcher; 3. Dick Korda.

Kansas

The Olathe Chamber of Commerce in cooperation with U.S. Naval Air Station, Olathe, held their First Annual Midwestern States Championship Model Airplane Meet on Sept. 14. Events included: free flight classes (A, B, C and Jr., Sr., and Open); U-Control classes (1 to 6, Jr., Sr., and Open); Class for 6-A-Sleeve Bearing Engines only; Open Stunt; Beauty; and Flying Scale.

Maryland

The Maryland State Control Line Championship Contest combined with the Second Annual Hagerstown Flying Circus was held at Hagerstown Municipal Airport on Sept. 21. Events included A, B, and C Speed (AMA 1 and 2 combined, 3 and 4 combined, and 5 and 6 combined) and Stunt.

Massachusetts

Boston Aero-Modellers Assoc. has been reformed. This club is representative of the senior and open class fliers of the Boston area. The main interest is centered about free flight gas powered models. Meetings are held at different members' homes every other Thursday evening, while flying goes on every Sunday at the old Saugus Race Track in Saugus. Membership is being restricted to Senior and Open class fliers with some experience in model flying. President-elect of the Assoc. is Buddy Burke; Vice Pres., Lou Souther; Treas., Mark Pennachio; and Sec'y., Joseph Wenckus. Address all inquiries to Joseph Wenckus, 119 Antrim St., Cambridge.

Nebraska

The Omaha Model Builders Council sent in the results of the State Meet held in Omaha on July 20:

Free Flight

Class A—1. Al White; 2. Carl Wright; 3. Bill Peck.
Class B—1. Warren Peterson; 2. Jack Schnobrich; 3. Larry Erickson.
Class C—1. Jack Fluehr; 2. Don Cline; 3. Bill Parmenter.

U-Control

Stunt—1. Harold Christensen; 2. James Dreier.
Class A—1. C. W. Mumaw.
Class B—1. C. W. Mumaw; 2. Clyde Bourgeois.
Class C—1. C. W. Mumaw; 2. B. D. Baker.
Rubber—1. Herbert Kothe; 2. Keith Homan; 3. Bob Ecklund.

New Jersey

The American Society of Model Aero

Engineers held their International Air Classic for rubber powered model aircraft at the Bendix West Golf Course at Teterboro on Aug. 1-2-3. George Levine of New York City won first prize, John Yellen second, and Frank Ehling third.

* *

Albert T. France, Contest Director, sent in results of a U-Control Meet held at Wildwood on July 27:

Class A Jr.—1. Leroy Redman.
Class B Jr.—1. Ronnie Munro; 2. Fay Peoples; 3. Allan Macfarlan.
Class B Sr.—1. Robert Veasez.
Class B Open—1. John Lessig.
Class C Sr.—1. Harry Cosby; 2. Jas. Gross; 3. Robert Veasez.
Class C Open—1. Matty Kania; 2. John Lessig; 3. Frank Threapleton.

New York

The Metropolitan Hobby Guild of N.Y.C. sponsored a Model Airplane Glider Contest on August 10 at Flushing Meadow Model Airport.

Ohio

The *Marion Prop Busters* sponsored an AMA sanctioned Model Airplane Meet on Sept. 14 at the Marion Municipal Airport. Events included: free flight gas, rubber cabin and stick, stunt, towline, and H.L. gliders.

Oregon

Salem Cloud Chasers held a free flight contest on July 27 with the following results:

Class A Sr.—1. K. Burr; 2. J. St. Claire; 3. S. Burnette.
Class B Sr.—1. B. Critchlow; 2. O. Brown; 3. B. Garner.
Class C Sr.—1. R. Nichol; 2. O. Brown; 3. L. Burnette.
Class A Jr.—1. A. Hoadely; 2. R. Chalker; 3. J. Fuez.
Class B Jr.—1. A. Hoadely; 2. R. Richard; 3. N. Goldstein.
Class C Jr.—1. R. Chalber; 2. A. Hoadely; 3. J. Fuez.

* *

Here are results of the Free Flight Contest held by *Salem Model Airplane Club* on August 3 at the Salem Airport:

Class A Jr.—1. J. Messick; 2. R. Chalker; 3. P. Keefer.
Class A Sr.—1. R. Bentely; 2. R. Nichol; 3. C. Grove.
Class A Open—1. K. Burr; 2. L. Sherman; 3. S. Alexando.
Class B Jr.—1. R. Russel; 2. A. Hoadely; 3. L. Lux.
Class B Sr.—1. W. Davy; 2. R. Nichol; 3. C. Grove.
Class B Open—1. Leo Brocway; 2. B. Critchlow; 3. G. Crandel.
Class C Jr.—1. R. Keefer; 2. A. Hoadely; 3. C. Dahler.
Class C Sr.—1. W. Davey; 2. R. Nichol; 3. J. Sills.
Class C Open—1. Earl Cayton; 2. K. Burr; 3. S. McEntee.

Tennessee

The Second Annual Tennessee State Model Airplane Contest sponsored by Nashville Legion Post No. 5, Nashville Aero Club, and The Nashville Banner was held July 4-5 with these results:

Free Flight

Class A Gas Jr.—1. James J. Singleton; 2. Rickey Stewart.
Class A Gas Sr.—1. Gene Parson; 2. A. R. Pardue; 3. J. P. Bell, Jr.
Class B Gas Jr.—1. Rickey Stewart; 2. Beverly Gooch; 3. Donald McLure.
Class B Gas Sr.—1. Robert C. Henry; 2. Lloyd Welchel; 3. Elmo Dooley.
Class C Gas Jr.—1. Beverly Gooch; 2. Jimmy Dunbar; 3. Rolland Anderson.
Class C Gas Sr.—1. Charles P. Martin; 2. Gene Parson; 3. T. Calloway.
Towline Glider Jr.—1. Bob Groover; 2. Don Follis.
Towline Glider Sr.—1. Henry H. Savage; 2. Tommy Cainess; 3. Elmo Dooley.
Rubber Powered Stick Jr.—1. Jewett Bordron; 2. Bill D. Collins.
Rubber Powered Stick Sr.—1. Charles P. Martin; 2. Claude Curry; 3. Joe Baker.
Rubber Powered Fuselage Jr.—1. Bob Groover; 2. Rolland Anderson.
Rubber Powered Fuselage Sr.—1. James D. Cahill; 2. Frank Vollrath; 3. Claude Curry.
Hand Launched Glider Jr.—1. Rolland Anderson; 2. Ray Sells; 3. Valentine Bell.

Junior U-Control

Class I—no contestants.
Class II—1. James J. Singleton; 2. Herbert Davis.
Class III—1. Rolland Anderson; 2. Jimmy Scott; 3. Jimmy Singleton.
Class IV—1. Don Angel.
Class V—1. Herbert Davis.
Class VI—1. Rickey Stewart; 2. Carson Wright, Jr.
Scale Event—1. Rickey Stewart.

Senior U-Control

Class I—1. Charles Milam; 2. Richard Gregory.
Class II—1. Ray Robertson; 2. Donald McClusky; 3. J. S. Culver.
Class III—1. Vernon Hahn; 2. John Kaserman; 3. Tom Trent.
Class IV—1. Gerald Gartman.
Class V—1. Tom Trent; 2. James Jennings; 3. P. B. Luiel.
Class VI—1. Tom Trent; 2. James Robinson; 3. Buddy Pleiss.
Scale Event—1. Richard Tichenor; 2. J. F. Mitchell; 3. Davis Bynum.
Grand Awards—1. John Bell; 2. Charles H. Milam; 3. James Robinson.

Canada

The Verdun Stamp and Hobby Shop of Verdun, Quebec sponsored a Model Airplane Contest on August 17. Results:

Moffett—1. J. Beauregard; 2. R. Briscoe.
Stick—1. Lou Hooper; 2. Jack Beauregard.
Rubber—1. Dick Tracy; 2. Robert Nichols.
Rubber Models 37" up—1. R. Briscoe.
Towline Gliders—1. S. McGurk.
Class A Gas—1. Charlie Duval; 2. Cliff Greaves.
Class B Gas—1. J. Beauregard; 2. Cliff Greaves.
Class C Gas—1. Charlie Duval; 2. Joe Rose.
Hand Launched Gliders—1. Dick Tracy; 2. Cliff Greaves.
Junior Event—1. Douglas MacKay.
U-Control Class A—1. Dennis Johnson.
U-Control Class B—1. Dennis Johnson; 2. Dick Tracy.
U-Control Stunt—1. Grant Cleland.
Longest Rubber Powered Flight before 4 p.m.—1. Jack Beauregard.
Longest Rubber Powered Flight after 4 p.m.—1. Lucien Therrien.
Longest Gas Powered Flight before 4 p.m.—1. Joe Rose.
Longest Gas Flight after 4 p.m.—1. Cliff Greaves.

Duplicate the Detail

(*Continued from page 32*)

result is realistic. On the other hand, construction of the scale model Lycoming engine in the accompanying photographs is principally an example of scale duplication of detail. The assembled engine is composed of many details, each of which is an attempt at duplicating rather than suggesting the visible features of the corresponding part of the actual engine.

As was mentioned above, each of these ways of treating scale detail has limitations; frequently the method of suggestion is overworked. Interesting in this connection is the fact that often the process of suggestion is not the shortcut expected but equally difficult and tedious, while the results are apt to be less realistic. An example is one common method of modeling the finned cylinders on aircooled engines by wrapping thread around wood dowel of appropriate cylinder size. Perhaps from a distance the result suggests a finned cylinder although clearly the representation lacks realism. (For example, the overhang of the fins from the cylinder wall on the actual engine is always greater than the fin thickness.)

An alternative method was employed in the engines illustrated. The cylinders were built with the idea of duplicating (as far as external features were concerned) the fin arrangement of the actual engine rather than suggesting this. This method consists of building up each cylinder by successive layers, forming alternately the cylinder section at the fins and at the intervening spaces. For example, a cylinder having 18 fins between the base and the cylinder head would be built of 18 layers each shaped to the external section at the fins and 17 or more layers (depending on the design)

each shaped to the external section of the cylinder proper. The material suggested for the layers or sections is cellulose acetate sheet doped black. This material, or other plastic sheet, is available in thicknesses from .005", usually in increments of .005 either at model stores or plastic stores. Each layer can be cut to approximate shape with scissors and filed or sanded to exact uniform size. Simple calculations from the scale drawings of the cylinder will determine the appropriate thicknesses of the material used for the alternate sections. On many cylinder designs it will be found that the fin spacing is not uniform (the fins are closer together nearer the cylinder head), thus it will be necessary to use material of different thicknesses representing the intervening spaces between fins. Also, the fins may not be equal in thickness to the distance between fins.

Cylinder heads can also be built by this method although modifications will be required in case the fins are not parallel as is often the case. The Menasco cylinder head is an example. Also, it will be necessary to plot accurately the various cylinder head sections at the fins since these invariably differ from each other.

There appears to be at least one criterion in scale model work for deciding whether to suggest or to duplicate a detailed feature. That is feasibility. In many cases it is impractical if not impossible to duplicate a particular feature. Such is the case with rivet detail; or to give another example, instrument panel detail. Even the most conscientious model craftsman would hesitate at building in miniature an altimeter or any other instrument to a scale of, say, one inch to one foot. Authenticity can be maintained, however, even though the feature involved is for the most part only suggested, if the model builder pays close attention to the significant characteristics of the feature. In the case of instrument panel representation, if photos of instruments are glued to a blank panel the general effect may be that of an aircraft instrument board, but the degree of realism is questionable. Close examination indicates only photos of instruments glued to a blank panel. Many of the characteristics of the actual panel have been ignored. However, if instrument photos are selected with careful reference to scale, covered with thin transparent plastic, and mounted behind a panel which has appropriately cut holes, the chief characteristics of the aircraft instrument board can be obtained by suggestion.

If the significant characteristics of any feature of the airplane are emphasized in the model's representation of the feature, realistic results are certain. This is the reason scale model propellers intended to duplicate airplane wooden props are far more realistic when carved from a laminated block of wood. The laminations on a wood airplane prop are a significant characteristic well worth reproducing in the scale model prop. Alternate layers of light and dark wood can effectively emphasize this characteristic by contrast. (For easier carving choose woods of similar density—redwood and pine, for example.)

In the majority of instances unrealistic scale model detail is the result of an attempt to suggest a feature that is quite capable of being duplicated. There are many examples of this, one of the most common being the use of thread or music wire to suggest external rigging wires. On all aircraft since about 1927 such wires have been oval in section, their

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chief characteristic. It follows that material round in section can only suggest such landing or flying wires. The actual duplication to scale of this oval section (streamlined wire) is not difficult. Model streamlined wire can be formed from either tinned or soft iron wire, flattened by careful hammering on a metal or stone surface and filed or sanded to proper section. It will take experimenting to find exactly the proper diameter wire to use. As an example, however, No. 24 tinned wire can be worked to an oval section the greater diameter of which is 1/32". On a scale of one inch to one foot this corresponds to 3/8" streamlined wire, a common size on the empennage rigging of light planes.

The extent to which duplication of detail can be carried depends in part on the scale of the model. In the true detailed scale model, duplication of control systems and such features as retracting or shock absorbing landing gears is certainly required, and the scale of the model should be chosen so that these features are practicable. Control systems perhaps do not properly belong in the category of external scale model detail. An operating control system, however, is a definite contribution to overall realism even though the system for the most part is not visible. There is no question here of suggestion or duplication—the system must be duplicated in detail and the actual construction is determined by the design and arrangement of the actual system. Successful construction depends in large part on the choice of suitable material. Almost every control system employs an arrangement of connecting rods, torque tubes, lever arms, and cables in some combination. Suitable materials for connecting rods or torque tubes are soft iron wire, brass tubing or welding rod. Copper or brass sheet is suitable for bell cranks or control surface hinge fittings. Aluminum is to be avoided in all scale model operating systems since it lacks the hardness essential to keep play from developing.

Reference has been made to scale aircraft engines, rigging wires, instrument panels, wooden props, and control systems. These are probably typical of the type of scale detail required on most scale models. It has been assumed that the scale model builder before attempting to represent features of this sort will: (1) be thoroughly familiar with the actual feature being duplicated; (2) have available accurate scale drawings of the feature. These are the two necessary preliminaries to the construction of any scale detail.

The method of suggesting particular features (as distinguished from actual duplicating to scale) should be adopted only as a last resort—not as a shortcut. Handling of detail by suggestion is tricky at best and is apt to be equally as difficult as the actual construction of the miniature part. Whatever method is chosen, realism depends to a considerable degree on close attention to the significant characteristics of the feature in question. Above all, scale detail should appear as an integral part of the model and not as gadgets affixed to the model as an afterthought. This means that details must be planned while the model is being planned. Realism in scale models can seldom be bought readymade at the nearest model shop—it calls for a lot of tedious work. But, as all scale model fans have discovered, the time spent on achieving realism pays dividends in lasting satisfaction.

INDEX

of Articles in this year's issues of Model Airplane News

THE December issue of M. A. N. will contain a complete INDEX of all articles that have appeared in the 12 issues of 1947. An index is such a valuable reference aid and time-saver that many readers write us they compile their own index of articles in M. A. N. They will now be saved the efforts by obtaining the December issue each year.

Don't miss December

MODEL AIRPLANE NEWS

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Scaling Plans

(*Continued from page 31*)

illustrated in part I, except that it is possible to use shortcuts by establishing key points. Graphing merely establishes the actual course of lines regardless of their shape, while scaling can save much time through locating centers from which circles can be swung, etc. Begin by laying out a set of central axes from which to take references. Airplane designers almost invariably use the thrust line of the plane as the longitudinal reference, or X-axis, with some conveniently located vertical reference known as the Y-axis drawn at right angles to it. This latter can be located almost anywhere, passing through such diverse places as the leading edge of the wing, or through the vertical axis of the propeller, for example. It is generally convenient to have it coincide with some vertical member or line of the fuselage.

On the Fokker illustrated, it has been located at the front of the radiator, which is itself vertical. To locate points on the large drawing that match those on the smaller, lay the scale of the smaller drawing parallel to the X-axis of the small drawing, and note the distance of the point from the Y-axis. Then with the scale parallel to the Y-axis, determine the distance that the point lies from the X-axis. This is known as establishing the co-ordinates of the point; they can be duplicated on the larger drawing by repeating the process with the larger scale. Curves can be plotted by determining the co-ordinates of a number of points along the curve, as illustrated on the underside of the nose in the double-size Fokker drawing, locating these points on the large drawing, then connecting them up with a pencil and French curve, or free-hand. Straight line details such as the machine gun can be developed through the intersection of projected lines, as illustrated, without bothering to measure actual points. Long straight lines need only to have their end points established by co-ordinates, while such irregular shapes as the airfoil sections of wings are best blocked out in the box form shown. Since most flying models have their airfoils plotted separately, it is necessary only to establish their position on the drawing.

The model builder can save himself a lot of work by using the intersecting line method used to draw the machine gun on the other views of the overall drawing. This method, known as orthographic projection, is illustrated by the three view drawing in part I. Notice that each view is a projection of the two others, the top being projected from the side and front. While not in the same plane, the side and front views are projections of each other thanks to the 45 degree diagonal connecting the intersection points of the extreme top and bottom projections of each view. All other projections that intersect this line are merely turned 90 deg. before being continued. By this method it is possible to use any two views to draw a third with very little reference to the original except for details.

Notice how many points on the top view are located by projections from the other views. From the side view we get the overall length, the leading and trailing edges of the wing, the longitudinal position of the landing gear and strut terminals, and the location of the cockpit and other details. From the top view we get the width of the fuselage, span of the wings, tread of the landing gear, lateral locations of the struts, and the span of the

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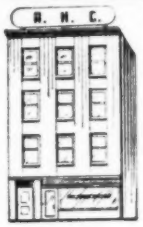

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DeLong 30	(CL B)	19.50
Forster 29	(CL B)	19.50
Hurricane	(CL B)	19.75
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Merlin	(CL B)	18.00
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Torpedo	(CL B)	18.50
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Dennymite	(CL C)	21.50
Ohlsson 60	(CL C)	11.95
OK Super 60	(CL C)	21.00
Rocket	(CL C)	22.50
Vivell 35	(CL C)	18.00
Vivell Twin	(CL C)	35.00
Pacemaker	(CL C)	24.95
OK 29	(CL B)	18.50
OK Super 29	(CL B)	19.50
OK Twin	(CL C)	55.00
Super Champion	(CL C)	23.50
Atwood Champion	(CL C)	18.00
Atom	(CL A)	15.50
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Arden .199BB	(CL A)	21.50
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Perky	(CL A)	18.00
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Hurleman	(CL C)	20.00
Madewell	(CL C)	18.00
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Mite Diesel	(CL A)	18.95
G.H.Q.	(CL C)	9.95
McCoy 29	(CL B)	19.50
McCoy 49	(CL B)	25.00
OK 60 Race	(CL C)	26.00
Forster 99		24.75

See Premiums on Price-Fixed Items

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(No Premiums)

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Rogers Ram	(CL B)	9.95
New Thor	(CL B)	9.95*
New Thor Kit	(CL B)	6.95
Ohlsson 19	(CL A)	9.95
Ohlsson 23	(CL B)	9.95

*Includes coil and condenser

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Mogow Plastic (pen. or med.)	.40
Aero Coil (Featherweight)	2.50
Aero Coil (Quality)	3.00
Smith Competitor Coil	1.95
Arden Coil	2.50
Winston Coil	2.00
Wilco Coil	1.95
Regular Coil	1.50
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Paper Condenser	.20
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High Tension Lead Wire	.15
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Switch	.25
Alligator Clips	.10
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Vitamite Booster Batt.	5.00
Power-plus	
Flight Battery	2.75
Booster Battery	3.50
House Charger	4.45
Auto Charger	1.95
Arden Flight Timer	1.85
Austin Flight Timer	1.50
Comet Flight Timer	1.00
Hillcrest Flight Timer	1.25
Universal Needle Valve	.75
4-Way Plug Wrench	.15
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Spinit Starter	5.00
Aluminum Engine Mounts	.50
Flo-Torque Props 8" to 14" 15" .50 16", 18"	.35 .75
Hi-Ball 9", 10", 11", 12"	.35
Tooping 10" Multi-pitch Prop	1.50
Topping 12" Multi-pitch Prop	1.75
Comet Props: 9", 10", 11" 12"	.35 .40
Hi-Pitch Props: 8", 9", 10", 45c; 11", 50c; 12", 13", 60c; 14", 65c.	
Snafu Plastic Prop 10" 12"	.75 .90
Topping 3 Blade Plastic Props	1.50
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Troxler Balloon Wheels 2 1/2" 60c; 2 3/4" $1.00; 3" $1.25; 3 1/2" $1.50; 4 1/2" $1.75.	
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Modelers Plane	.75
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Midget Screw Driver	.10
Hi-Tension End Clips, each	.05
Tip Jacks Set	.60
Jam Pump Can	.75
Plug Gauge Set	.15
Alum. Prop Spinners 5/8", 20c; 13/16", 30c; 1 3/8", 75c; 1 1/2", $1.00; 1 3/4", $1.00; 2", $1.25; 2 1/2", $1.50; 2 3/4", $1.75.	
Presto Disc Starter	.25
Bamboo paper—white, green, blue, each	.10
Wood Stripper	.25
Celluloid Sheet	.10
Austin Tank	.50
Froom Gas Tank	1.00
Winston Tank	.75

FREE FLIGHT PLANES
(FREE: See item 9 above)
For "A" & "B" Motors

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Buccaneer 36"	1.50
Boo 48"	1.95
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Strates 42"	2.95
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(FREE: See item 9 above)

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horizontal tail surfaces and lateral location of such details as the machine guns, all of which would have to be scaled from the three view if each view were being drawn separately.

As a concession to convenient working sizes, it is frequently desirable to draw only one side of top and front views, as has been done here, building such things as wings one-half at a time. Three view drawings frequently appear in this form to utilize the available space and yet make the drawing as large as possible for clarity of detail. The fact that many of these drawings are not in orthographic projection need not deter the model builder from using that system in making his own drawings, however.

We have presented in these two articles most of the more widely used enlargement methods, and the model builder will surely be able to select a method fitting his skill and equipment.

END

Model Airplane Newsletter

(*Continued from page 6*)

for beauty. That's 400 points and obviously impossible—but you get the idea.

After the judging by a process of elimination and visual grading, everybody flies. You receive 1 point per mile per hour that your ship does. You can fly from a pylon, or by hand, whip, stand on your head, or bake a cake while flying if you wish because no matter what you do you can add only a few miles per hour to the speed of the model; and in this type of a contest, speed is not of paramount importance. So whip her around if you want to. Of course, the better your model is the less whipping you'll probably do.

Now, after getting in your speed points, you next go into the stunting phase of the contest and do as many standard stunts as you wish. In general, the event will follow the regular A.M.A. stunt rules except we'll provide the judges with not only a printed list of stunts and points allowed, but we'll also diagram these right on the same sheet to avoid conflicts and arguments. Total possible number of stunt points should be not more than 150 or 200. Thus, if your model flies 200 mph and you do every stunt in the books you can pick up not more than 400 points, which is exactly what you've already collected in the scale, beauty, ingenuity and workmanship judging.

Tex Foster wants to add a few more points and one stipulation, which would require all entries to carry their landing gear. Our suggestion would be to give up to 10 points for takeoff (dolly takeoffs are not always too smooth) up to 10 points for landing, and an additional 25 points if the model retracts and extends its landing gear while in flight. Oh, yes, if the model lands on its belly or a skid—no points. That means a fellow carrying his landing gear could collect up to 20 points with a fixed gear, while the dolly crowd could garner only 10 points as a maximum.

How does it all sound? Frankly, we think something along these lines (and we do not say it is precisely the foregoing) would give control line flying a shot in the arm and result in more average or "Sunday" flyers getting out and in the meets.

What chance does the general run-of-the-mill modeler have today against the souped-up engines and the souped-up experts? If he can't do 120 miles per hour he may as well stay out of the speed trials; and if he hasn't 3 or 4 different stunt jobs with special tanks, wheels, and gadgets he can't go far against the stunt specialists.

Let's get U-Control back to where the average modeler has a chance. It's gone too far along the path followed by the race car and power boat crowd—and look where they are: a small band of super experts fearful of showing others what they've got, spending endless hours arguing over the fine print in the rules booklet, newcomers not welcome.

If we can't correct the situation—then give me my boots and my free flight job. I'm tired of turning my head around like a swivel watching the same few fellows walk off with the U-Control prizes. Let's have some new faces in the winners' circle!

* * *

Last winter you may recall we recorded the visit of C. S. Rushbrooke, editor of the English publication, "The Aeromodeller," and a well known model designer and expert in his own right. It was extremely unfortunate that Mr. Rushbrooke's visit came during midwinter at the height of the stormy weather and during a period when model activity was practically nil. All he saw in the way of modeling was a few speed trials in New York City's big Kingsbridge armory and those conducted without too much equipment or with any degree of formality. It is to be regretted that the English representative could not have witnessed the Mirror Model Flying Fair (for vastness and well-oiled contest machinery), the Philadelphia Flying Circus (for impressive awards, smoothness of operation), the Washington, D.C. National Capitol Meet (for interest on the part of government officials), or any one of a thousand other free flight, indoor and outdoor rubber, hand, launched and towline glider meets held throughout the U.S. this year as well as control line speed, precision and stunt flying.

We cannot condemn Mr. Rushbrooke for saying that "America seems to have gone control line crazy and as a further development, speed crazy." Our previous remarks bear him out. But we hate to see him get the idea that control line models are "developing into engines mounted on extremely small streamlined fuselages with very small flying surfaces, and the ridiculous seemed to have been reached in one model which consisted of engine, fuselage and one-half wing and stabilizer, these being mounted on the outboard side of the machine."

He concluded, "Obviously all that is happening nowadays is that a projectile is kept swinging out purely by centrifugal force and nothing else." True, all too true. But don't judge us too harshly by those few exceptions you saw, Mr. R. Why, we wager that if you travelled the country you could find an occasional control line model which could be glided from a height of 6 feet without smashing to bits because it *did* have some wing area!

But we really were hurt when one of the photos illustrating the report ("American Commentary") showed a youngster supposed to be Davis Slagle (we don't think it was he) with a box-type control ship captioned "this typical example of American aerodynamic design!"

Brother, that one hurt! Because if there is one nation that builds what looks to us ugly, unstreamlined, sloppy-looking planes, it is our good friend England. A glance through any issue of any British model magazine makes you think you're back in the '20's. Majority of models are slab-sided, straight chord wings, absolutely without inspiration as far as tail surfaces are concerned, and for the landing gear—especially on gas jobs—they appear to be from the middle ages.

One thing we will grant the British—a handful of experts build beautiful Wakefield type and soaring glider models. But as for the average ship entered in the national and international English meets (speaking now of powered planes), they look like something Maxwell Bassett was building when he introduced gas model flying to America.

Not only are most British models hideous examples of how not to build and design planes, but the turnouts at the big meets are pitifully small. Take the biggest event in the British Nationals—164 entries. That doesn't stack up against a lot of our local meets!

What's the answer? Well, we think British modeling and British aeromodelers aren't too bad, and we're quick to praise anything they turn out that looks good to us—and a lot of their stuff is good, mighty good. But they're just discovering pylons

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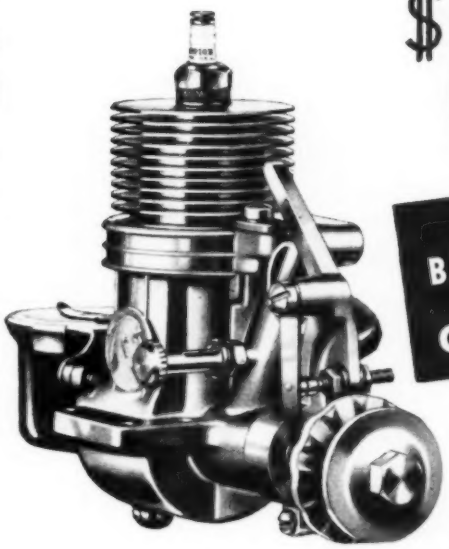

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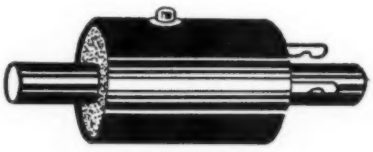

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SEND FOR FREE FOLDER

for gas flying over there on a wide scale, and their 99 official record categories are less than 1/3 filled; so by our standards they're lagging considerably.

So how about it, Rushy? How about coming back some time during our contest season so we can show you some real free flight gas jobs, some control line stunt and scale planes, some 130 mph speed flying, some indoor jobs doing 25 minutes plus at Lakehurst. 1,200 entries in our National meet? Come on back, Chum. Give us another chance!

"Miss L"

(*Continued from page 23*)

shown on the plan. The nail should slide freely inside the soda straw.

The landing gear can be bent as shown and soldered to the steel channel. This can clamp and be pinned on the fuselage to serve as a permanent or a droppable gear.

When the fuselage sandwich is dry, trace the outline from the plan and cut roughly to shape. Determine the cutout necessary for your engine and make this accurately. Mount the engine with prop, spinner and landing gear, and pin the wing and tail surfaces in place temporarily. Arrange the solenoid, batteries and coil to make the CG one inch back from the wing leading edge. Note exact location of the coil, batteries and solenoid and make cutouts in fuselage to fit them. Next finish the fuselage to the correct outline.

After checking the fit of all units, cement the wing and tail units in place, lining them up carefully.

The complete model should be covered with silk or Silkspan. Then dope several times, giving a light sanding between coats. Apply several coats of auto body filler, wet emerying between coats. When all surfaces and joints are smooth, apply several thin coats of colored dope.

Install the solenoid. When controls operate smoothly, cement in place. The battery connections, coil and fuel tank can be cemented in place. Note that the engine lies on its side with exhaust down. Place wood spacers underneath the mounts, if necessary, to bring the engine shaft on the center line of the fuselage. To offset the unbalance of the engine, place the coil, batteries and condenser off to one side on the fuselage. Solder wiring in place. Note the wiring diagram on the plan for the solenoid control. Pressing the upper switch makes the elevator go up; pressing the lower makes it go down; pressing both switches gives nearly neutral. There should be 1/8" up and 1/16" down movement.

With battery connected, the operator should note the time required to raise the temperature of the solenoid so that it burns his finger. This time should not be exceeded when controlling the model. If longer than 50 ft. cable is used, the voltage will have to be increased.

FLYING—The first flight should be made with engine near maximum power. The model flies in a clockwise circle so the torque will keep it to the outside. The first flights can be made in U-control fashion with the cable tight and whipping used to get the model in the air. The solenoid will give you instantaneous control which is more positive than regular U control.

Those interested in this control might use variable resistors to give smoother action. Another possibility is rudder control using another solenoid and two more wires in the cable. This should give complete model control if properly designed. It would be interesting to hear of anyone working on this type of control.

1st International Model Plane Contest

ONE of the really big contests of the year was the 1st International Model Plane Contest, sponsored by the Plymouth Motor Corp., and held in Detroit on August 13-16. The event was a sort of trial balloon by Plymouth to gain experience in a field entirely new to them—and from informal opinions we have heard since the meet, they were delighted with the way things went off.

Although it was not so stated when the contest was announced, the Plymouth Corp. made a strenuous effort to interest their many thousands of local auto dealers in every part of the country and in overseas territories. While the time was quite short (the contest was only announced to the public early in June), things moved fast and a large percentage of the dealers entered actively into the preparations. The result was something entirely new in model aviation contests—over 87% of the entrants were sent to Detroit with all expenses paid by their home-town Plymouth dealers. Some contestants flew, others traveled by train, and quite a few were loaned new Plymouth cars into which they piled family, friends and models to make the trip. While we haven't received full details of who travelled the farthest, we understand three or four contestants came all the way from Hawaii!

In an effort to assure that the competition would be of the highest caliber, the field of entrants was limited to 500, and these 500 were carefully selected from flyers who had high ratings based on their recent contest records. This was done because it was too late to stage regular runoffs in every part of the country, although such runoffs were held in some cases.

The meet was conducted under AMA sanction and rules and there were no application or entry fees required. In addition to 94 trophies—one each for the first three places in each event—a total of $6,000 in cash awards were made. These were graded from $100 for first place down to $10 for fifth. The events included indoor and outdoor rubber, free flight gas, and control line gas, each event being split into the usual Junior, Senior and Open classes.

D. S. Eddins, president of Plymouth, presents high point trophy to winner in Junior Class, Richard Tarjany

While limited space does not permit our going into extensive detail on the many little features that make a contest enjoyable to those who enter, we can mention a few things that were really appreciated.

Since the outdoor events were all held at Selfridge Field, some 30 miles from the center of Detroit, a fleet of buses was provided morning and night to take modelers and their ships to and from the field. Selfridge Field is a huge place and the free flight events were held a long distance from the hangars where meet headquarters were

(Above) Left to right, Wilbur Kreight, Jason Hayward, Howard Chevalier and George Kamouris, on the free flight field. (Below) Four contestants get ready to fly their free flight jobs

set up, and near which the control line events were run off; shuttle buses were run continuously around the field, free to contestants and spectators alike. Also, jeeps with trailers were in constant operation on the field collecting free flight models and modelers.

A presentation dinner held at the Hotel Statler on the night of August 16 was the occasion for handing out the hardware, and the contestants had a meal they will long remember. Another innovation of the meet was an "Oldtimers' Dinner" held August 15 for all model builders over 25 years of age who had built models prior to 1935.

All in all, Contest Director Merrill Hamburg and Plymouth should be well pleased with the results of their first meet, and we know most modelers who attended, hope a similar meet will be held annually.

Detailed list of winners of First International Model Plane Contest held in Detroit this summer will be found on third cover page of this issue.

Prop Carving

(*Continued from page 22*)

Photograph No. 1 shows the block blanked out for cutting. A power jigsaw or bandsaw does a good job but, lacking that, a hand hacksaw will suffice. (And besides, it takes longer to saw off a finger.)

No. 2 shows the block blanked to outline shape and almost ready to carve. But one day Papa was smitten with an idea, so look at—

No. 3. See those three black lines? They are saw cuts running almost to the bottom at left margin diagonally up almost to the top right margin. This method greatly cuts whittling time on the inside of the prop and materially increases the safety factor. It is possible to cut out an inch or so at a time without danger of cutting a finger.

No. 4 shows method of cutting cup into prop. Start at tip end and work down toward the hub. As you can see, two sections have been cut out in prop shown in illustration. Do not attempt to cut too deep with one stroke. Take light cuts at first until sufficient dexterity is developed, then experience will guide you on depth of "bite." On reaching the last saw cut section shown, the cut on the hub end is done carefully by reversing the direction of cutting as indicated by the grain in the balsa.

No. 5 shows the inside or back of prop completely carved and ready for sanding. The carving should be done carefully, and sufficient skill will soon be developed so that it will not be necessary to sand excessively to remove knife marks. The cup in the prop should be carved in, not cut straight and then sanded in. Sanding is solely for the purpose of attaining smooth finish, not for shaping.

No. 6 shows the next step. Cut the blade to finished outline shape as shown. The shape chosen is, like the hub type, a matter of personal choice; and the conventional shape, as shown, is very efficient. Again, in shaping the finish outline, cut in the direction that takes advantage of the wood grain. After cutting a few props natural horse sense, plus the experience gained, will make a seemingly complicated job easier than duck soup.

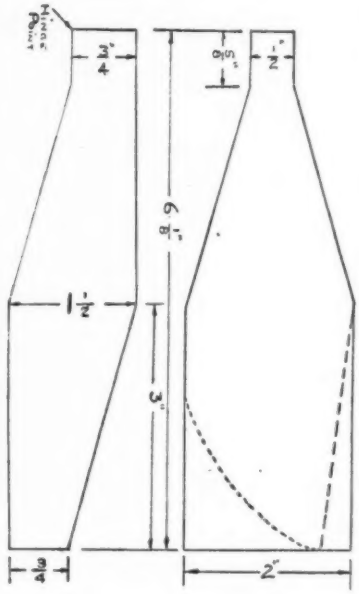
Your prop is entirely carved on the cup side and has its finished outline shape. Now we can turn it over and carve the front face. Since the back had a concavity of 1/8" to 3/16" the front face must be convex to the same degree.

Look at No. 7 which shows the finished blade. The finish cut, or outside carving, is not started at the tip as the cup side is,

but is started at the hub and worked up towards the tip. Again, let's remember to take light cuts until sufficient skill and confidence is acquired to really go to town. The thickness through the blade should be from 3/32" to 1/8", to within an inch of the hub. Here the blade thickness increases slightly. Keep that blade thin. Remember that weight and correct blade foil are important, and that the best of ships will fail for want of a good prop.

After sanding the prop completely it is ready for doping, but be sure of a thorough sanding job. Use fine paper and sand in a slightly blunted leading edge and a knife-sharp trailing edge.

Mix equal parts of dope, acetone and talcum powder for the first coat of dope.



Apply one coat of this nasty-looking concoction and allow to dry thoroughly, then sand just as thoroughly with fine wet-dry, paper and son, make that the best sanding job you ever did. It's important! Coat with clear dope, dry and sand well, then repeat. Use a good gloss dope. Even four coats is O.K. and will greatly strengthen the wood structure.

It goes without saying that the builder will invariably use a one blade folder, but for those who have to learn the hard way, two blade jobs can be made in a like manner with twice the work and 75% of the results. No. 8 shows a one blade folding prop with split hub for quick change.

Although gas props are cheap and easily obtainable, the same general procedure would apply in prop carving with, of course, changes in prop foil crossection, outline and type of wood used—and here's today's prediction: some smart lad is going to change control line model speeds by doping out a reduction drive to slow up the prop rpm and using a wide blade, square-tipped creation that will really wind those gee-line babies up.

Let's part with this thought: The big-time model names got there by experimenting. If it were a new, unorthodox prop, it was carved by the builder, not bought. So learn to use your hands and acquire skill to do the tough jobs in model building because it pays off in the end.

(*Continued from page 27*)

difficult to fly. Quite to the contrary, once it was mastered the *Camel* was a pleasure to pilot. With a proper load distribution placing the CG in correct position, the *Camel* was light on the controls and very responsive. It could not be flown in a straight line hands-off because of the gyroscopic effect produced by the engine, but a normal patrol could be accomplished without undue pilot fatigue. On the other hand, where a great deal of maneuvering was necessary combat fatigue was inordinately high.

The *Camel* took off quickly, climbed well and landed slowly in a short space. Little else can be said other than *Camels* were laterally and longitudinally stable and easy to fly. Their stall was quite abrupt, but plenty of warning was given either with power on or off.

Sopwith Camel 2F.1

After the original production *Camel*, type *F.1*, had been manufactured in considerable numbers and proved itself at the Front, its designers created an improved model known officially as the *2F.1*. Outwardly it was impossible to tell an *F.1* from a *2F.1* unless one got a long look at the modified ship from a direct front view. Centersection of the *2F.1* was shorter in span than in its predecessor. That feature was brought about by a reduction in overall span from 28 ft. in the *F.1* to 26 ft. 11 in. in the *2F.1*

Chord of both wings remained the same as before—4 ft. 6 in. Overall length remained the same and the empennage was identical to that of the *F.1*.

While changes in wings of the *2F.1* were quite apparent dimensionally, the new *Camel* looked like the same old *Hump*. Incidence of both wings was 2 deg. Gap at the fuselage was reduced to 4 ft. 11-1/16 in. and at the outer struts was only 4 ft. 2-13/16 in. Stagger was the same as on the *F.1*, including the slight sweepback to the lower wing. Dihedral of the lower wing was increased to 5-1/2 deg., and the upper wing remained flat. These wing changes were the result of increasing the power in model *2F.1* by installing the 150 hp BR.1 rotary engine. To properly utilize the added power, a larger prop was fitted and its height was increased to 8 ft. 10 in. maximum in flying position by lengthening the landing gear.

When the *2F.1* made its appearance late in 1917, the Royal Naval Air Service was experimenting with ship-borne aircraft. In the course of tests, two aircraft carriers (the first in the world to feature full flight decks suitable for the takeoff and return of land type aircraft—H.M.S. Furious and H. M. S. Argus) were commissioned. The R.N.A.S. had already outfitted a number of battleships and cruisers with removable platforms which attached to their guns and from which an airplane could be launched. No provision was made, however, for the plane's return, and it either landed in the sea next to the ship or tried to make land. The next step was the construction of large barges, big enough to permit a plane's takeoff, but again the plane was forced to land in the water or return to an airport.

In either case, requirements dictated an airplane capable of taking off in a minimum space. Of all the then modern aircraft, the *Camel* was the only one which could fit the bill fully loaded. Early in 1918 a flight of 18 *2F.1 Camels*, each on its own little barge towed by a trawler, approached the German North Sea Sta-

THE DOPE SHEET

Congratulations to Allan and Kitchens (and their DOOLING power plants) for coming away with first honors in the Minneapolis Nationals — speed, 133.33 MPH! Ditto for first in meets at Tucson, Rockford, Detroit International and Joliet, Illinois. That's breaking out in a rash of wins. Swell flying, fellows, and thanks for the telegram.

The following are figures on the recent National Cable Races, Indianapolis. Track stuff (Proto) and DOOLING "61" engines, naturally. Quarter-mile, first, F. A. Robertson —116.13 (new official record); half-mile, first, Art Poore—112.94 (new official record); one mile, first, Art Poore—112.25 (new official record). Results on points: 1st, F. A. Robertson of Dallas, Texas; 2nd, Art Poore of Los Angeles, California; 3rd, Norb. Jannsen of Los Angeles. Keep 'em revving.

—The DOOLING Reporter

tion of Tondern. This place was the site of the German Navy's biggest Zeppelin establishment, and from it was launched a majority of the Zeppelin raids against England. As the *Camels* came within striking distance, each took off from its 75 ft. long barge and set a course for Tondern. Under each *Camel* were four 25 lb. bombs—two H. E. and two incendiary.

To make a long story short, the *Camels* put Tondern out of commission temporarily, for it was not until October 1918 that the base was returned to active status. Zeppelins, sheds, hydrogen works and shops were hit with as much force as could be expected of 1800 lbs. of bombs, but the desired effect was gained. The *Camels* returned to sea, landed in the water next to the barges, and the pilots were taken off. No planes were lost in this raid due to enemy action, and all pilots returned to tell the tale of the first concerted attack against a land base by seaborne land planes!

The barge version of the *2F.1* wasn't the last to be heard of carrier *Camels*, however. Toward mid-1918 a number of *2F.1 Camels* were constructed specifically for carrier operation and featured a folding fuselage hinged just aft of the trailing edge of the lower wing. The fuselage could be swung parallel to the wings and thus be stowed in the hold of a carrier. This method was expedient for the time and much easier than redesigning wing structure for folding. This *Camel* was based on the *2F.1* but popularly known as the *Sea Camel*. The *Sea Camel* also boasted the first floatation gear ever fitted on a service type airplane. The gear consisted of rubberized cloth bags enclosed in panels built into the sides of the fuselage near the center of gravity. Upon landing, the pilot released compressed air from storage tanks which filled the floatation bags and kept the *Camel* afloat for up to 7 hours.

Some day, perhaps, the full story of the Sopwith *Camel* will be told. Its career as a fighting plane is highlighted by some of the most important events in the military air annals of W.W.I. Roy Brown flew a *Camel* when he downed von Richthofen; the *Camel* was used exclusively for night-time defense of London against Zeppelin and Gotha raiders up to the end of the war. The *Camel* was the first heavier-than-air-craft to be launched from a lighter-than-air-craft; the list goes on and on.

But the *Camel* will best be remembered for its ability to fight, on even terms, everything the Germans could put into the air during its better than year-and-a-half active life.

Model	Engine Type	Engine H.P.	Weight Empty (Lbs.)	Weight Loaded (Lbs.)	Fuel Capacity (Lbs.)	Range (Miles)	Speed—MPH 6,500	Speed—MPH 10,000	Speed—MPH 15,000	Climb in Mins. to 6,500	Climb in Mins. to 10,000	Climb in Mins. to 15,000	Ceiling (Ft.)	Landing Speed (MPH)	Load Sq. Ft. (Lbs.)	Load HP (Lbs.)	Military Load (Lbs.)
F.1 Camel	LE RH.	110	889	1,422	252	330	124	118.5	111	5.2	9.2	16.8	24,000	35	6.2	10.4	101
F.1 Camel	G.M.	150	993	1,523		275	123.2	117.5	107	6.3	10.2	19.6	23,700	35	6.5	10.15	
F.1 Camel	C.	130	929	1,453	243	300	119.1	113	106.5	6.0	10.6	20.7	19,000	35	6.3	11.5	101
F.1 Camel	G.	100	882	1,387	224	300	110.7	106	100	7.2	11.8	23.2	18,600	35	6.0	13.8	101
2F.1 Camel	A.R.1	150	977	1,508	250	290	116.5	111	103	5.5	9.8	20.0	18,000	35	6.5	10.1	101
2F.1 Camel	B.R.1	150	946	1,470	271	310	127.2	121	114.5		8.3	15.8	23,000	35			
2F.1 Camel	B.R.1	150	1,036	1,530	223	276	124	118	112	14.7	11.5	25.0	18,000	38	6.7	10.2	91

Weights and Performance of Production Sopwith Camels

ENGINE ABBREVIATIONS:

LE RH.—LE Rhone
G.M. —Gnome Monosoupape
C —Clerget
G. —Gnome
A.R.1 —Admiralty Rotary
B.R.1 —Bentley Rotary (Re-designated A.R.1)

Model Airplane Course for Beginners

(*Continued from page 29*)

are used for holding the belly block into position after the cartridge has been inserted and pierced.

The forward section of the assembly (B-1—B-2) is covered with 1/32" sheet balsa, as is the upper surface of the fuselage onto which the wing must seat. Balance of the sub-assembly is covered with Silkspan.

Tail boom construction is relatively simple. Consisting of two identical parts (an upper and lower shell), the boom is circular in crossection. The two shells are made by cementing 1/16" sq. balsa strips to appropriately notched formers T-1 to T-5, and covering each half with 1/32" sheet. Note that the base stringers extend rearward beyond formers T-5, and upon cementing the shells together along these two, soft balsa filler blocks are used to carry the circular form of the boom to a point or "cone shaped" end. It is on the balsa filler section that we later cement the rudder. Also note that former T-1 is set at an angle to the base stringers in order to insure a slight angular elevation to the tail boom centerline upon assembly to the forward fuselage section.

The tail boom formers T-1 are cemented to fuselage former B-5 on completion of the sub-assemblies. A 1/32" sheet balsa fillet connects the lower surfaces of each assembly and permits a gradual form change of the body surface contours.

The landing gear struts must be formed, cemented and bound into position before the fuselage can be called complete. A tail skid of .040" wire must also be formed, cemented and bound to the aft end of the tail boom.

Tail Surfaces—As shown in the plans, the tail surfaces are constructed of 1/8" sq. and 1/8" x 1/4" strips. The stabilizer is constructed of two panels—one left and one right. These must be cemented together forming a slight dihedral as shown in the photograph of the finished model. Each tip is elevated about 1-1/4" in order to obtain the desired dihedral angle.

Upon completion of the tail surface frames, sandpaper the 1/8" sq. leading edges round and the 1/8" x 1/4" trailing edges to a taper. Cover the surfaces with Silkspan.

Wing—Constructed in two panels, the wing of our model is of conventional design requiring no special emphasis on building procedure. The ribs are of 1/16" sheet balsa notched to take a 1/8" sq. rear

FOR FLYING SCALE ENTHUSIASTS

An unusual rubber driven flying scale model by DICK STRUHL will be featured in the December issue of MODEL AIRPLANE NEWS. This is the Lockheed *Saturn*, a twin motor cabin ship with tricycle gear that is a beautiful flier. Full size plans will be available at $1.

spar and a 1/8" x 1/4" front or main spar. The leading edge is of 1/4" sq. balsa while the trailing edge is 1/8" x 1/4" strip.

Assemble the wing in the same manner used for previous models. Cover the center section (upper and lower surface) with 1/32" sheet and the balance of the panels with Silkspan. A wedge shaped piece of balsa following the contour of rib R-1 is used between the two panels forming the required tip rise of 2". Cement the panels together and allow the glue to harden.

Assembly—Before final assembly, the Silkspan covered sections of the model are sprayed first with water and when dry painted with clear dope to insure drum tightness. Several coats of clear dope may also be applied to the wood-covered portions of the plane as protective coating. Use sandpaper between coats for a smooth finish.

Next, cement the rudder to the fuselage as shown in the drawings. The stabilizer is cemented atop the rudder as shown in the photo.

The wing is fastened to the fuselage by a loop of flat rubber and may be moved fore and aft to obtain desired balance.

The nose block is fastened to the body with two dress snaps, and the propeller (a readymade design 8" dia. x 3" pitch, as recommended by the engine manufacturer) is slipped onto the prop shaft and bolted into place.

Two short lengths of wire extending from the front of the belly block into the aluminum tubing cemented to L-1 and the dress snap at the aft end of the assembly hold the belly to the fuselage.

A pair of 1-1/2" dia. wheels are slipped onto the landing gear. A drop of cement at the end of each axle prevents the wheels from dropping off.

Balance—As in the case of previous designs, balance point of the craft (complete with CO_2 capsule installed) should be about 1/3 back from the wing's leading edge. Shift the wing until the ship balances as required. Two 6" lengths of 1/8" x 1/4" strips are cemented to the fuselage to form a suitable platform for the wing when its approximate position has been determined.

Flying—Glide the ship to check balance. Pre-flight procedure does not vary from that described in previous lessons. Power flights and glides require the same wing setting.

Instructions for operating the engine are furnished by the manufacturer and are therefore not included in this lesson. The craft is designed to make a rapid climb under gusty conditions and then land after a long glide.

Experimenting with wing incidence setting and tail warpage for varied flight conditions is recommended.

• •

With this, the seventh lesson in our course for *beginners*, we have completed a range of designs from the simplest cardboard glider through the rubber class and up to the simplest motor-powered flier. The next logical step, of course, is gas-engined designs. We feel that those beginners who have faithfully built and mastered each of the seven models presented in these lessons should be able to launch out on his own, since he can no longer be classed as a "beginner." We are therefore terminating the course with this lesson.

We are greatly interested in hearing from those who have followed this course. Has it helped you to master model aviation? Have you any suggestions or criticisms? Drop us a line! (Write: Editor, MODEL AIRPLANE NEWS, 551 Fifth Ave., New York 17, N.Y.)

Plane on the Cover

(*Continued from page* 15)

phibian designs was J. Byron Jones, who joined Goodyear and produced the *Duck* along very similar designs to the original Applegate. First model was the Goodyear GA-1, designed by Jones and Ed Burn. It was substantially similar to the present GA-2 but was powered by a Franklin 113 hp engine. This version was completed and flown in 1945, but early test flights indicated the need for additional power. A larger Franklin 145 hp engine was installed and, together with minor changes, resulted in the present *Duck*, which first flew in March 1946.

The hull is of all-metal construction and designed on the basis of lines developed by NACA. It has flat sides and tapers towards the rear to the rudder post. Only a single step is used, with the afterbody tapering rearward into a flat undersurface. The wing is of metal structure, fabric covered. It is full cantilever and mounted atop the fuselage. Fixed slots are mounted in each wing leading edge out near the tips to provide adequate airflow over the ailerons near the stall. The floats are fixed and are moulded of laminated plastic composition in a single piece with no external bracing.

The landing gear is retractable, the wheel folding up and inward into wells located just under the wing-hull intersection. A conventional tail wheel is located under the rudder post and is also retractable. Both the main gear and tail wheel are retracted by electric motors.

The GA-2 is a three-place airplane with the pilot and one passenger located forward of the wing in a large, roomy enclosure. The second passenger is located directly behind these two within the cabin. The reason one and not two passengers are carried aft is due to the location of the wheel wells on either side of the rear seat. The wells are padded and smoothly designed on the interior, however, providing arm rests for the rear passenger. A large automobile-type door is located on the starboard side of the canopy which opens forward for ingress and egress. In addition, a small hatch on the left side of the enclosure enables the pilot to climb out on the bow to handle mooring lines or anchor.

The engine is mounted atop the fuselage on a pedestal to provide clearance for the prop, which is a Koppers Aeromatic with "automatic variable" pitch, a type of constant speed control. The Franklin engine is aircooled with air intake located on the forward side of the nacelle. In addition, a cooling fan is mounted on the prop hub to draw air from the intake across the engine cylinders, the engine being mounted in reverse due to the pusher installation. This fan provides adequate cooling, according to Goodyear engineers, even during taxiing periods on the water when many amphibians and flying boats show a tendency to heat up.

Handling characteristics of the *Duck* seem satisfactory to those who have flown it. Only major criticism heard to date is its stall characteristics, generally believed to be due to the high location of the engine. In tractor installations, and in pusher installations in which the engine is located approximately on the wing chord, the slipstream from the prop normally enables the airplane to fly at a slightly higher angle of attack before stalling with power on than with power off. The *Duck* wing, however, does not have this advantage and the stall comes

quite suddenly, although both aileron and tail controls continue responsive, the former due to the slots and the latter due to the slipstream from the prop.

A major complaint about the *Duck*, however, is that it is quite noisy, both to passengers inside and to observers on the ground. This results from the high prop speed caused by the direct-drive Franklin engine, this installation being almost identical to that on the Republic *Seabee* which is notorious for its noise. However, the design of the *Duck* cabin makes soundproofing impractical if not impossible, whereas the *Seabee* soundproofed cabin is not particularly noisy.

The wheel controls are mounted directly into the instrument panel, with wheels for both pilot and co-pilot. An electric direct-drive starter is mounted on the engine. Complete instruments are carried and two-way radio is mounted in the cabin. A retractable water-rudder is fitted, controllable from the cockpit. Total of 45 lbs. of baggage is provided for in addition to the three occupants.

The Goodyear GA-2 has a span of 36 ft. and is 26 ft. long. It stands 9 ft. 4 in. high, weighs 1450 lbs. empty and has a useful load of 750 lbs., giving it a normal gross weight of 2200 lbs., made up of three 180-lb. passengers, 30 gals. of gasoline, 2½ gals. oil and 45 lbs. of baggage. It has a top speed of 125 mph and cruises at 60% power at 110 mph. Range is about 300 miles. It climbs at 600 ft. per minute and has a service ceiling of 12,000 ft.

One of the major purposes for Goodyear's test program is the fact that the GA-2 is equipped with Goodyear tires, single-disc brakes, pliocel fuel tanks, air-foam seat cushioning and tail wheel shock absorber. This program will provide valuable service information on these Goodyear products.

Of the 15 airplanes to be built, 5 will remain at the Goodyear plant in Akron for local test purposes. The remaining ten will be distributed as follows: two to the Pacific Coast, possibly one in Southern California and the other in the Puget Sound area; one to Chicago; one to Minneapolis, three along the Gulf of Mexico and three on the Atlantic Coast.

Many amphibian fans are watching these tests closely in the hopes that Goodyear will: (1) take out the bugs from the design and develop a proved, finished product; and (2) that they will decide to enter into the production and sale of the *Duck*, a name incidentally which is not yet official and which Grumman has used previously for a Navy amphibian.

'47 Nationals

(*Continued from page* 11)

gear and separate throttle for each motor. No, don't laugh—such a model was actually started by a novice in this work.

The flying scale model contest, which was a combined event (that is, rubber and gas models competing together) was won by the beautiful Ryan *Fireball* model which was pictured in *"Air Ways"* August M.A.N. The judging of the scale models was held Tuesday night, and on Wednesday the winners had to prove to the satisfaction of the judges that the models could actually fly. Models could be flown either control or free flight at the discretion of the builder.

(*Turn to page* 72)

In addition to the flying activities, several important A.M.A. meetings were held. An open Contest Board Meeting produced a good turnout, mostly of Leader Members. Discussion on rules was lively, with many diverse opinions aired.

Also, the regular annual meeting for all A.M.A. members was held, but the turnout was disappointingly small. It is probable that the modelers were in a state of near collapse by this time and just couldn't drag themselves out (we know quite a few who had no trouble dragging themselves into Big Lake, however). At any rate, the loudest complaints on rules and model problems in general will undoubtedly come from those who couldn't be bothered to attend the meetings.

Friday night, of course, was the date for the big Victory Banquet at Hotel Radisson in Minneapolis. After a dinner limited only by the size of the participants' plates (and stomachs), Frank Nekimken took over as Master of Ceremonies and introduced many of the Minnestota Legionnaires and others who labored long and hard to make the Nationals a success. Following this the lengthy job of distributing the impressive array of trophies was started.

The inevitable protests were filed after the announcement of the prize winners. This year the protests were more serious than usual, however, since some of them affected the standing of the Grand Champion who was to be awarded a Piper Cub. As matters stood on Friday night, Frank Cummings of Los Angeles was on top, followed by Mark Heller, Keith Storey and Chet Lanzo.

The meet sponsors—the American Legion and the Forty and Eight of Minnesota—came in for much praise and also for the usual brickbats, but any way you look at it the 1947 Nationals was a very large five days and will long be remembered in model aviation history.

1947 NATIONALS WINNERS

INDOOR STICK; HAND LAUNCHED

Junior—1. Richard Tarjany; 2. Raymond Wykes.
Senior—1. Robert Bienenstein; 2. Donald Robers; 3. Edmond Morosky.
Open—1. Michael Demos; 2. James Cahill; 3. Milton Huguelet.

INDOOR CABIN; RISE OFF GROUND

Junior—1. Richard Tarjany; 2. Raymond Wykes; 3. Jack Cook.
Senior—1. Roger Bienenstein; 2. Bill E. Tharp. 3. Robert L. Denton.
Open—1. Merrick Andrews; 2. F. L. Cummings; 3. James Cahill.

INDOOR GLIDER; HAND LAUNCHED

Junior—1. Jack Cook; 2. Bob Clemmens; 3. Barre J. Badenlos.
Senior—1. R. Bienenstein; 2. C. D. Rushing; 3. Richard Geist.
Open—1. Bob DeBatty; 2. Milton Huguelet; 3. Manuel Andrade.

OUTDOOR RUBBER; MULVIHILL STICK

Junior—1. Raymond Vargo; 2. Jack Cook; 3. Barre Bodenlos.
Senior—1. Robert Bienenstein; 2. Andrew Tagliafico; 3. Frank Garcher.
Open—1. Mark Heller; 2. Bernard Green; 3. Austin Leftwich.

OUTDOOR RUBBER; STOUT CABIN

Junior—1. Jack Cooke; 2. Bill Kempton; 3. Michael Onofrey.
Senior—1. Bill Tharp; 2. Richard Geist; 3. Allan Trainer.
Open—1. F. L. Cummings; 2. Robert Champine; 3. R. J. Dunham.

OUTDOOR WAKEFIELD CABIN TYPE; RUBBER POWERED

Junior—1. Marvin Fromm; 2. Michael Onofrey.
Senior—1. Ed X. Morosky; 2. George Matsumoto; 3. Wheelon Schonenky.
Open—1. Frank Cummings; 2. F. L. Parmenter; 3. Henry Cole Jr.

TOWLINE GLIDER; OUTDOOR

Junior—1. R. L. Clemens; 2. Richard Ehman; 3. Barre Bodenlos.
Senior—1. Herbert Breitinger; 2. Donald Holmes; 3. James R. Jones.
Open—1. Robert Holland; 2. Chester Lanzo; 3. G. X. Perryman.

GAS FREE FLIGHT CLASS A

Junior—1. William V. Trumble; 2. Roger Barron; 3. Ronnie Sharpton.
Senior—1. Fred D. Whiting III; 2. Larry Stockstad; 3. Nicholas Sinder.
Open—1. Wm. Fletcher; 2. Jerry Kolb; 3. Paul E. Gilliam.

GAS FREE FLIGHT CLASS B

Junior—1. Jerry James; 2. William Trumble Jr.; 3. J. L. Horton.
Senior—1. Fred Whiting III; 2. C. P. Hall; 3. Gene Treuter.
Open—Results pending final decision of AMA Contest Board.

GAS FREE FLIGHT CLASS C

Junior—1. Edward Mate; 2. Melvyn Levy; 3. Donald Cline.
Senior—1. George B. Goff; 2. Russell Booth; 3. Jack Greenspan.
Open—1. Jerry Brofman; other places pending final decision of AMA Contest Board.

CONTROL LINE SPEED; CLASS I & II

Junior—1. J. J. Singleton; 2. Wayne Rinehart; 3. C. F. Jones.
Senior—1. William Thomas; 2. Jack Norris; 3. Bob Thor.
Open—1. J. R. Robinson; 2. Henry C. Cole Jr.; 3. Robert McCarthy.

CONTROL LINE SPEED; CLASS III

Junior—1. F. N. Proust Jr.; 2. Wayne A. Rinehart; 3. Watson Jilks.
Senior—1. William Thomas Jr.; 2. Bob Thor; 3. Jim Whitlatch.
Open—1. Keith H. Storey; 2. Donald Newberger; 3. Les McBrayer.

CONTROL LINE SPEED; CLASS IV & V

Junior—1. Fred Forster; 2. Al Wadleigh; 3. J. J. Singleton.
Senior—1. Sam Beasley; 2. Alfred Stegens; 3. Richard C. Fall.
Open—1. Keith H. Storey; 2. Allan & Kitchens; 3. Donald W. Newberger.

CONTROL LINE SPEED; CLASS VI

Junior—1. P. F. Hubert Jr.; 2. B. J. Krider; 3. Fritz Probst Jr.
Senior—1. Bob Thor; 2. Leslie H. Gerhardt; 3. L. H. Mahieu.
Open—1. Allan & Kitchens; 2. R. H. Thomas; 3. J. D. Curry.

CONTROL LINE STUNT

Junior—1. David Slagle; 2. Jack Hudspeth; 3. Jack Gilroy.
Senior—1. Don Gulotta; 2. Bud Jamison; 3. Frank Stanton Jr.
Open—1. Robert Tucker; 2. J. C. Yates; 3. John E. Clemens.

CONTROL LINE SPEED JET POWERED All Age Classes

1. George Sweet; 2. Merle Koeberniek; 3. Howard Lundquist.

FLYING SCALE; RUBBER POWERED

1. Chester Lanzo; 2. D. C. McKercher.

FLYING SCALE; GAS POWERED

1. R. M. Kirn; 2. Dale Kirn.

RADIO CONTROL

1. Dr. Walter Good & Dr. Wm. Good; 2. Jim Walker; 3. L. Victor Brown.

NATIONAL CHAMPION

Frank L. Cummings Jr., Los Angeles, Calif.

CLUB NATIONAL CHAMPION

Thermal Thumbers Model Airplane Club, Los Angeles, Calif.

SENIOR NATIONAL CHAMPION

Robert Bienenstein, Detroit, Mich.

JUNIOR NATIONAL CHAMPION

Jack Cook, Chicago, Ill.

Flash News

(*Continued from page 2*)

two Wright *Cyclone* engines, Douglas has not yet announced plans for the design, but until he does the aviation world is in a quandary.

CAA FLIGHT TESTS on *Convair Liner* are now underway with two airplanes being used to speed up the test, the first time this has been done. The new, more rigid CAA tests, promulgated since the war, include an "accelerated service" test consisting of strenuous flight tests of the airplane about 10 hrs. per day across the country for about one week. Consolidated Vultee has already gained about 200 hrs. of flight test on the prototype and is confident the CAA tests will be routine and will be completed within 30 days.

MANUFACTURERS HAVE THEIR cargo transports all lined up awaiting announcement of AAF procurement orders for the type for fiscal year 1948 due to be revealed at any time. Those in the competition are: Boeing *Stratocruiser*, Douglas *Globemaster*, Martin military 3-0-3, Convair C-99 and Northrop *Pioneer*. In addition to the giant, long-range types, AAF is known to be definitely interested in medium-size, slow-landing "attack transports" for supplying forward areas with restricted landing areas. The *Pioneer* is an especially strong contender in this category.

BOEING'S XL-15 HAS been successfully test flown and production is under way on an order for a second prototype and ten YL-15 production models. The "flying gondola" is being built at Boeing's Wichita plant, which may be closed after L-15 production is completed. An additional contract is expected. Craft can land at 35 mph and take off in 600 ft., clearing a 50 ft. obstacle. It is powered by a Lycoming 125 hp engine and seats two.

GONE IS THE biplane from the military scene after 44 years of faithful service to man. Both the Army and Navy have abandoned the biplane primary trainer and virtually eliminated step one in the training of an aviator. Student pilots are now started from scratch on the North American low-wing monoplane (AAF AT-6, Navy SNJ) after trial classes graduated successfully. Real reason for the change is the absence of funds for biplane trainer procurement and the abundance of North American trainers on Army and Navy fields.

BELL AIRCRAFT HAS completed the manufacturer's demonstration flight test program on the XS-1, and the tiny rocket-powered research plane has been officially delivered to AAF. Completion of the program signalled the end of Chalmers "Slick" Goodlin's contract with Bell, and he is now in Hollywood in response to several screen offers. Capt. Charles Yaeger AAF has been designated the Army pilot and is now making familiarization flights preparatory to an assault on the sonic barrier. Ultimate full-out tests will be in a 45° climb with each succeeding second lowering the weight of the plane as the liquid oxygen and alcohol are consumed. Those close to the project are still convinced the XS-1 will fly at 1400 mph and climb to 120,000 ft. in one minute, a simultaneous speed and altitude record.

LOCKHEED AIRCRAFT RECEIVED a contract to modify 508 model P-80A *Shooting Star* fighters into P-80B by adding water-injection equipment, provisions for JATO units, rocket launchers, cockpit cooling equipment. New flat wingtips and canopy defrosting equipment. The $7,500,000 contract is scheduled for completion in March 1948. P-80A fighters now in active service will be flown to Lockheed in Burbank and placed on an assembly line with pilots picking up modified craft at the other

end. In addition, 52 special kits will be made up and shipped overseas where modifications will be made on service models.

THE HOPPICOPTER IS still "just around the corner," and each change in the once-promising device brings it nearer to a full-fledged "old-fashioned" helicopter. Horace Pentecost, Seattle inventor of the gadget, originally created a simple device that strapped to the back of the pilot and enabled him to soar across the skies a la "Buck Rogers." First a frame was added, then a seat, then a larger engine and now a tricycle landing gear. And as these items have added weight, Pentecost has added rotor blade area. In the meantime, an Austrian inventor has produced a model along the original Hoppicopter "back pack" idea and is hopeful of making it successful in this original form. "Give an engineer a simple device and he'll make it more complicated in 24 hours than a layman could in a lifetime," or words to that effect, were never more apt than when applied to this 21st Century miracle that almost came to pass in the 20th century.

ONE MODERN MIRACLE however may shortly come to pass, although it was first produced in experimental form in 1908: the roadable airplane. The second Fulton Airphibian has been completed and is now undergoing CAA certification tests. Service tests to date on Robert E. Fulton's attractive flying automobile proves the craft entirely practical and, although production plans have not yet been announced, at least 10 are known to have been promised buyers.

ULTIMATE FORM of the DeHavilland DH-108 is now revealed as a jet transport, the DH-106, which will be powered by four DeHavilland *Ghost* turbojet engines of 5000 lbs. static thrust each. The transport will feature swept wings as in the ill-fated DH-108 in which Geoffrey DeHavilland lost his life. The new transport is not expected to fly until 1950.

ONE OF THE WORLD'S outstanding aeronautical research scientists, but one of the least known, Dr. George W. Lewis, has resigned as Director of Aeronautical Research of the NACA after holding the post for 28 years. A list of his achievements is far too long to list here but suffice it to say that he, more than any other man, moulded and formed aeronautical research in the U.S. from the stick-and-wire days of 1918 to the Douglas D-558 sonic research airplane. To him goes much of the credit for the form and advances of the modern aircraft, although his retiring nature has prevented the recognition he so richly deserves. Dr. Hugh L. Dryden, National Bureau of Standards, replaces him as NACA Director. Dryden has had a distinguished career as a specialist in aerodynamics and sound at the NBS and is particularly noted for his contributions to the theory of boundary layer turbulence. He was in charge of development of the Navy "Bat" and other glide bombs and guided missiles during the war.

THE SECOND NORTHROP XB-35 "Flying Wing" bomber is now undergoing flight tests at Muroc following a successful test flight from Northrop Field. Fred Bretcher, former Boeing B-29 pilot, was at the controls with Max Stanley co-pilot. The first XB-35 is still undergoing repairs and modifications to the propeller gear box assemblies, following repeated failures during flight tests. The YB-49 jet-propelled bomber, mounting eight TG-180 turbojet engines, is scheduled to fly this fall.

CURTISS AIRPLANE Division has been awarded a $2,000,000 Navy contract to overhaul 36 R5C *Commando* transports during the next two years. The work will be accomplished at the Columbus, Ohio, plant.

THE LONG-AWAITED four-place Luscombe has been revealed as a straight utility design without frills. The fuselage is squarish and the passenger compartment is raised in a large tonneau, giving the craft the appearance of a high wing *Navion*. Outstanding feature of the Model 11 *Silvaire* is vision, and both pilot and passengers have 3,716 sq. in. of window space through which to view. With a 165 hp Continental engine, the new craft cruises at 120 mph. Luscombe has not yet announced

production plans or a price tag pending CAA certification.

ONE OF THE TRULY significant developments in recent aviation is the successful completion of early test flights by the Saunders-Roe Saro A.1 jet propelled flyingboat, a "couldn't-be-done" accomplishment. Powered by two Metropolitan Vickers turbojet engines mounted side-by-side in the hull, the single-seat fighter gets off the water in 10 seconds, which is ⅓ the time required for conventional flyingboats. This takeoff performance is particularly astonishing in view of the notoriously slow takeoff of jet propelled aircraft. Air intake is located in the extreme nose and four 20 mm cannon are mounted alongside the intake. The pilot is located atop the fuselage. British see the single-seat flyingboat fighter as the answer to "island hopping" and landing strip problems in the Pacific.

THE AAF ANNOUNCED the Bell XR-12 five-place military helicopter, a military version of the Bell Model 42, which first flew over a year ago but which has been held under wraps in the interim. The new model is designed for passenger, cargo, ambulance, artillery spotting, air-sea-land rescue operations and general utility transportation. A total of 12 is being built. Delivery of a production quantity of R-13, the two-place Model 47, has been completed.

Design Forum

(*Continued from page* 13)

to low resistance because it shot skyward in a vertical spiral to great altitude on at least one trial at the contest. Now you sum up. You have plenty of wing area, plenty of power. Your plane is not overweight. The wing section is efficient. Drag is low. What is the next step?

You recall from sad experience that the most important thing in model flying is *stability*. Many of your planes have been efficient but have cracked up on the first flight because they would not remain in the air. At the contest your plane flew with great steadiness. Nevertheless, you check over your design for stability.

First, you measure up the side elevation of your plane (Fig. 2). The most important point is checked first; that is, the position of the center of lateral area, called the CLA. This should be approximately on or below a line passing through the center of gravity (CG) and parallel with the thrust line. When the CLA is in this position, your plane will *resist* any spiral diving influences. You note with satisfaction that the CLA is in a safe position. The position of the rolling axis N-N is then noted. This should slant slightly upward for best results because the ship rolls about this axis, and when the front end is raised it will roll with the nose pointed up, not down. Consequently, at the takeoff and when the torque banks your plane steeply, it will nose up and climb rapidly to a safe altitude instead of banking with the nose down and diving into the ground.

Of course, with the CLA in the correct position, the banking tendency will be slight, but if the CLA is far above the CG, then the bank will be steep. This may not necessarily result in a crash if the rolling axis is slanted well upward at the nose. In the latter case, the plane will bank sharply and nose up into a tight spiral. If the CLA is on a line with the CG, as in your plane, the climb will be steep and almost straight. Possibly it will bank slightly and spiral gently while climbing at high speed. All this passes through your mind, and you therefore check whether the neutral axis has been properly determined. Your wing rests on a small pylon, which insures that the forward CLA (Fig. 2) be in a raised upward position even though the body bellies

down at this point to provide plenty of keel area forward—keel area that will prevent the nose from slipping sideways and result in a dive when your plane banks steeply.

Next, you check the position of the rear CLA. The fin is low, which insures a low position of this point. With a high fin, you would expect it to be well above the point on your diagram. You find, however, everything is in order.

Next, you test the location of the CG vertically and longitudinally. It should be at least half the wing chord below the wing to give a pendulum effect and to increase both longitudinal and lateral stability. However, the CG should not be too low; it must be as high as the CLA. On the other hand, there is a third restriction. For best results it must be below the line of thrust, as shown in Fig. 2. This reduces the stalling and looping tendencies in a steep climb because it reacts with the thrust of the propeller to create a nosing-down couple. When above the line of thrust, it creates a stalling and looping couple. You remember such antics performed at the contest by planes with the thrust line well below the CG—planes where engines were mounted at the lower part of the fuselage with pylon and wing sticking up well above the engine. Such planes often fly well and win contests in spite of erratic behavior. However, planes designed as outlined here will fly even better and more consistently. You know this from experience. So far your model is correct.

Next, the position of the CG in a fore and aft, or longitudinal direction, should be approximately under the center point of the wing chord; that is, the wing leading and trailing edges should be equidistant from the CG. When you test your plane, you may find that the wing can be pushed forward slightly so that the CG is even nearer the trailing edge.

The next step is to check your fin area because, if it is too large, your plane will have a tendency to nose in toward the ground during turns. If it is too small, it will lack directional stability and your plane will crab through the air. Your plane represents the average gas model, and fin area equal to 6% of wing area is required. You check it carefully and find it satisfactory.

Longitudinal stability is affected by stabilizer area. If it is too small, your plane will be erratic and will stall easily. In fact, it will not fly at all if the area is equivalent to the value used in full-scale airplanes, which is about 15% of wing area. It should not be less than 25% of wing area, and for best results 33% should be used. You know this from your own experience as well as that of others. To make this area effective, the tail moment arm must be at least three times the wing chord. Yours is nearly four times the chord—well on the safe side (Fig. 3). To make the tail even more effective, you used a cambered uppersurface in combination with a flat undersurface. This provides extra lift on the stabilizer during climb and insures greater duration. It also allows the CG to be placed well rearward and makes adjustment for climb non-critical.

You note with satisfaction (Fig. 3) that the thrust line is quite high, protruding at the upper part of the fuselage and not the lower. You remember with relief how this feature held down the nose during the climb, yet kept it mounting skyward without interruption at a steep angle, while others with low thrust lines looped and spiralled tightly, losing valuable power and altitude.

Next, you check the angle of wing and stabilizer. You know that the difference in angle between these two surfaces must be at least 2° and preferably 2-1/2° for best results. They measure up satisfactorily, but what about the angle of incidence—that is, the angle of the wing relative to thrust line? This measures 3-1/2°, so you know that the stabilizer is just 1° positive to the thrust line. During some of your flights it was set at 0 with satisfactory results because the stabilizer is cambered. This type requires less positive stabilizer angle than stabilizers of symmetrical crossection.

The only remaining thing to check in your design is the wing dihedral. For efficiency, this should be small; for stability, it should be large. So, apparently, you are between two fires. Here, best results depend on your wisdom in making compromises. This is not difficult because you know from experience that a dihedral of about 9° will give satisfactory results. This is equivalent to raising each wingtip 1 in. for every 12 in. of wingspan, above the center point of the center wing chord taken on the uppersurface. Your wing may have a simple dihedral, with one break in the wing center or a polyhedral with three breaks: one at the center and one on each wing, approximately 55% of the half wingspan outward from the wing center so that it appears as shown in Fig. 4. This gives better results than the simple dihedral because the change in lift due to the side gusts or side slipping comes at a point nearer the wingtip in the polyhedral wing and, therefore, provides greater corrective moment.

Now you have tracked down every point in design that might contribute to duration and winning contests. Why was it, then, that you did not win? "Luck," you say. Oh no! Yet you insist it is luck because if you had just been able to start your engine after you had had one flight you would have been able to build up your flight time with the two additional flights due you. You excuse yourself by saying that it took so long to get your engine operating consistently that you had no time for your final flights. Such an excuse can be expected from the inexperienced, but from experienced model builders these comments are surprising because they know well that good design, knowledge of adjustment, and technique in flying are only some of the important factors that contribute to contest winning. Other factors are: proper structural design, convenient arrangement of engine, coil, batteries and other parts of the engine unit, and knowledge of how to quickly check and correct any troubles that may arise in engine operation. Ah! Here is where you may have fallen down. You built your engine, coil, batteries and wiring permanently and rigidly into your model. That is why it took you so long to fix that broken connection and to change batteries. Half your plane had to be disassembled and rebuilt again in order to do this because your engine parts were built integral with the plane structure.

That fellow next to you did not have this trouble. Repairs were made quickly and conveniently. He made three flights instead of one. You think back and try to picture the arrangement and construction he used. His engine was mounted on stringers like yours, but, you remember, these could be removed from his plane merely by withdrawing a wire pin. The stringers extended well beyond the extreme rear part of his engine and between them was mounted a sheet balsa box, in which the coil and batteries were detachably held. Reliable contacts were made

with metal plates by merely pressing the coil and batteries into place in the box. These plates were shaped so they held the parts rigidly. Nevertheless, additional straps of wide rubber held them tightly against the possibility of vibration shaking them loose from their points of contact. All wiring was held rigidly and permanently to the frame of this detachable engine mount. It could be withdrawn from the plane at a second's notice, mounted in a special test stand and parts inspected and tested conveniently and quickly. Broken wiring was no problem at all, but this seldom happened because the wiring was properly installed and held in place—something that is impossible when wires must be threaded through a delicate structure and inaccessible places.

You also recall how conveniently he tested his engine. He had no nicked fingers from attempts to change the timer position mounted close to the spinning propeller; nor did he have to stand on his head to find a way to inject gas into the tank because the tank opening was far down within the cowl at the bottom part of the engine. Of course, you could fly without a cowl and refuel your engine conveniently, but then cowls reduce drag and improve flight. So, you used a cowl and had difficulty in fueling your engine. The fellow next to you filled his tank conveniently because it was at the rear and accessible through his cowling. He also maneuvered his spark adjustment or timer conveniently. He had soldered an extension wire to the timer handle so that it extended rearward and away from the propeller. His fingers were not cut through any slip of the hand.

His booster jacks were also plugged in at a convenient point in the side of the fuselage near his engine. The jack was easily inserted and pulled out without danger of its flipping into the spinning propeller as yours did on one occasion, thereby breaking one of the blades and requiring a new propeller to be mounted. You recall that your booster jack had to be plugged in from the bottom of your plane up through a small hole in the cowl that was quite close to the propeller. When pulling it out, the end flipped into the path of the blades.

You realize with chagrin that all these delays produced by inconvenience in servicing, operating, and repairing your motor unit cost you a winning place in the contest. You recall how minute after minute you ineffectively spun your prop with only a derisive cough or two resulting. Then, again, you would have to tear your motor system apart to check the trouble and make corrections. Only too soon darkness fell and the contest ended. You returned without the cherished prizes, but with much valuable information that will supply the one factor which you require to win.

Perhaps we made a wrong assumption in your own individual case. Perhaps you are one of the winners and took great care before journeying many miles to the contest to have a reliable motor and motor unit. You probably learned through past experience that the technique of flying and a consistently operating and accessible motor unit are the essential factors of consistent flying and winning contests—factors that brought you success, instead of failure at the "Nationals"!

* *

NOTE: Do not forget to send in designs of your dream ships, both model and full scale, so that description and comments concerning them can be published in this department for the help and pleasure of other readers.

THE FIRST INTERNATIONAL MODEL PLANE CONTEST

DETROIT, MICHIGAN • • AUGUST, 1947

Here are the Winners!

CONTEST CHAMPIONS (High Point Winners)

JUNIOR CHAMPION (under 16)	SENIOR CHAMPION (16 to 21)	OPEN CHAMPION (21 and over)	CONTROL LINE STUNT CHAMPION
RICHARD TARJANY	**WILLIAM THOMAS, JR.**	**EDWARD NAUDZIUS**	**JAMES SAFTIG**
Wyandotte, Michigan	Daytona Beach, Florida	Highland Park, Michigan	San Diego, California

JUNIOR WINNERS

PLACE	INDOOR STICK	TIME FOR 3 FLIGHTS
1.	Richard Tarjany, Wyandotte, Mich.	755.1 Sec.
2.	Raymond Wykes, Medford, Mass.	526.5 "
3.	John Ward, Akron, Ohio	310.9 "
4.	Richard Ehman, Hartford, Conn.	244.5 "
5.	Alex Chizmadia, Detroit, Mich.	243 "

INDOOR CABIN

1.	Richard Tarjany, Wyandotte, Mich.	251.6 Sec.
2.	Raymond Wykes, Medford, Mass.	181 "
3.	Joe Williams, Clarksburg, W. Va.	39.4 "
4.	Jack Cooke, Chicago, Ill.	17.3 "
5.	Ronald Ogren, Clarksburg, W. Va.	10.3 "

OUTDOOR CABIN

1.	Jack Cooke, Chicago, Ill.	489.1 Sec.
2.	Bob Keough, Indianapolis, Ind.	473.1 "
3.	Bill Kempton, St. Joseph, Mo.	388.8 "
4.	Richard Tarjany, Wyandotte, Mich.	351.9 "
5.	Ronald Ogren, Clarksburg, W. Va.	339.2 "

OUTDOOR STICK

1.	Richard Tarjany, Wyandotte, Mich.	570.7 Sec.
2.	Raymond Wykes, Medford, Mass.	455.4 "
3.	Bill Kempton, St. Joseph, Mo.	441 "
4.	Jack Cooke, Chicago, Ill.	406.8 "
5.	J. Ward, Akron, Ohio	196.4 "

FREE FLIGHT CLASS A

1.	John L. Horton, Fort Worth, Texas	1391 Sec.
2.	W. Trumble, San Diego, Calif.	1033.5 "
3.	Jason Hayward, Tucson, Arizona	354.6 "
4.	M. Stephens, Springfield, Missouri	320.6 "
5.	R. Barron, Springfield, Va.	306.8 "

FREE FLIGHT CLASS B

1.	Jason Hayward, Tucson, Arizona	1635.9 Sec.
2.	Bill Kempton, St. Joseph, Mo.	544.8 "
3.	W. Trumble, San Diego, Calif.	286.8 "
4.	M. Smart, Portland, Oregon	283.9 "
5.	Bob Keough, Indianapolis, Ind.	218.8 "

FREE FLIGHT CLASS C

1.	B. Barron, Springfield, Va.	463.5 Sec.
2.	John L. Horton, Fort Worth, Tex.	398.5 "
3.	R. Barron, Springfield, Va.	391.1 "
4.	H. Snavely, Indianapolis, Ind.	286.8 "
5.	M. Stephens, Springfield, Mo.	239 "

CONTROL LINE CLASS A		SPEED
1.	James J. Singleton, Oak Ridge, Tenn.	93.1 M.P.H.
2.	Wayne Bigler, Pontiac, Mich.	86.9 "
3.	Glen Vandiver, Shreveport, La.	82.8 "
4.	E. Betley, Wilmington, Del.	79.5 "
5.	Fritz Probst, Wichita, Kansas	78.1 "

CONTROL LINE CLASS B		
1.	W. MacKerracher, San Francisco, Calif.	107.9 M.P.H.
2.*	A. Wadleigh, Inglewood, Calif.	105 "
	*Glen Vandiver, Shreveport, La.	105 "
4.	E. Betley, Wilmington, Del.	104.7 "
5.	E. Cooper, Phoenix, Ariz.	99.4 "

*Tie for second place

CONTROL LINE CLASS C		
1.	Fritz Probst, Wichita, Kansas	109.6 M.P.H.
2.	P. Hubert, San Marino, Calif.	108.9 "
3.	W. MacKerracher, San Francisco, Calif.	107 "
4.	A. Wadleigh, Inglewood, Calif.	105.5 "
5.	K. Mercer, Charlotte, N. C.	98.3 "

SENIOR WINNERS

PLACE	INDOOR STICK	TIME FOR 3 FLIGHTS
1.	George Haroutunian, Chelsea, Mass.	980.6 Sec.
2.	Robert Bienenstein, Grosse Pte., Mich.	822 "
3.	Carl Brewer, Detroit, Mich.	790 "
4.	Thomas Greet, Philadelphia, Pa.	772.2 "
5.	George Xenakis, Detroit, Mich.	750 "

INDOOR CABIN

1.	Carl Brewer, Detroit, Mich.	662 Sec.
2.	Robert Bienenstein, Grosse Pte., Mich.	599.8 "
3.	Robert Denton, Kenosha, Wisc.	586.4 "
4.	Robert Wykes, Medford, Mass.	551 "
5.	Richard Fox, Akron, Ohio	523 "

OUTDOOR CABIN

1.	Herbert Kothe, Omaha, Nebr.	618.6 Sec.
2.	Thomas Greet, Philadelphia, Pa.	531.7 "
3.	Robert Denton, Kenosha, Wisc.	523.4 "
4.	E. Morosky, Detroit, Mich.	448.6 "
5.	Erwin Rodemsky, Detroit, Mich.	399.4 "

OUTDOOR STICK

1.	E. Morosky, Detroit, Mich.	824.2 Sec.
2.	Robert Wykes, Medford, Mass.	808.9 "
3.	Herbert Kothe, Omaha, Nebr.	658 "
4.	J. Kubina, Detroit, Mich.	641.8 "
5.	R. Hawksley, Cranston, R. I.	607.2 "

FREE FLIGHT CLASS A

1.	W. Thomas, Jr., Daytona Beach, Fla.	852 Sec.
2.	E. Lays, Rochester, N. Y.	850.2 "
3.	C. Tavik, Baltimore, Md.	596.4 "
4.	J. Greenspan, Brooklyn, N. Y.	572.1 "
5.	Thomas Greet, Philadelphia, Pa.	511.5 "

FREE FLIGHT CLASS B

1.	J. Norris, Lakewood, Ohio	1707.4 Sec.
2.	H. Danick, Washington, D.C.	660.4 "
3.	W. Thomas, Jr., Daytona Beach, Fla.	526.5 "
4.	J. Kubina, Detroit, Mich.	517.2 "
5.	R. Bates, Clarksburg, W. Va.	408.9 "

FREE FLIGHT CLASS C

1.	E. Keck, Rochester, N. Y.	666 Sec.
2.	N. Walsh, Malden, Mass.	602.5 "
3.	R. Lagermeier, Minneapolis, Minn.	544.1 "
4.	R. Fox, Akron, Ohio	464 "
5.	J. Kubina, Detroit, Mich.	441 5 "

CONTROL LINE CLASS A		SPEED
1.	W. Thomas, Jr., Daytona Beach, Fla.	99.2 M.P.H.
2.	J. Summersett, San Antonio, Texas	96.1 "
3.	R. Hartlieb, Allentown, Pa.	94.1 "
4.	W. Gertack, Cleveland, Ohio	92.6 "
5.	T. Burns, Cleveland, Ohio	91.7 "

CONTROL LINE CLASS B		
1.	V. Feist, Houston, Tex.	108.2 M.P.H.
2.	R. Flaaten, Seattle, Wash.	107.9 "
3.	R. Hartlieb, Allentown, Pa.	107.6 "
4.	R. Veazey, Wilmington, Del.	105.4 "
5.	C. Blumer, Minneapolis, Minn.	104.4 "

CONTROL LINE CLASS C		
1.	J. Williams, Houston, Texas	122 M.P.H.
2.	R. Hartlieb, Allentown, Pa.	112.7 "
3.	E. Wallaker, Ann Arbor, Mich.	112.1 "
4.	L. Mahieu, Long Beach, Calif.	110.7 "
5.*	J. Morris, Lakewood, Ohio	110.6 "
	*V. Feist, Houston, Texas	110.6 "

*Tie for fifth place

OPEN WINNERS

PLACE	INDOOR STICK	TIME FOR 3 FLIGHTS
1.	Merrick S. Andrews, Forest Hills, L.I., N.Y.	966.3 Sec.
2.	Albert Blatter, Detroit, Mich.	959.5 "
3.	William Atwood, Glendale, Calif.	874.7 "
4.	Donald Everhart, Detroit, Mich.	855.2 "
5.	Richard Obarski, Akron, Ohio	809 "

INDOOR CABIN

1.	Edward Naudzius, Highland Park, Mich.	795 Sec.
2.	William Atwood, Glendale, Calif.	794 "
3.	Robert Holland, Sunland, Calif.	785.5 "
4.	George Sass, Detroit, Mich.	715 "
5.	Joseph Matulis, Chicago, Ill.	676.5 "

OUTDOOR CABIN

1.	James Ryan, Cleveland, Ohio	1325.4 Sec.
2.	Dick Korda, Euclid, Ohio	734.5 "
3.	Edward Naudzius, Highland Park, Mich.	660.3 "
4.	Joseph Nielander, Cincinnati, Ohio	627.5 "
5.	George Sass, Detroit, Mich.	558.6 "

OUTDOOR STICK

1.	Joseph Pedreira, New Orleans, La.	845.6 Sec.
2.	Robert Holland, Sunland, Calif.	829.1 "
3.	Edward Naudzius, Highland Park, Mich.	720.2 "
4.	Leonard Marzewski, Detroit, Mich.	694.1 "
5.	George Sass, Detroit, Mich.	618.5 "

FREE FLIGHT CLASS A

1.	John Etherington, Black River, N. Y.	1004.4 Sec.
2.	Dale R. Wilson, Flint, Mich.	736.3 "
3.	Frank V. Ehling, Jersey City, N. J.	718.4 "
4.	Melvin B. Phillips, Fresno, Calif.	629.3 "
5.	Henry Kaczynski, Detroit, Mich.	587.3 "

FREE FLIGHT CLASS B

1.	Ray Acord, Los Angeles, Calif.	5767.8 Sec.
2.	Dick Korda, Euclid, Ohio	1337.6 "
3.	Harold LaClair, Detroit, Mich.	984.7 "
4.	R. W. Wright, Topeka, Kansas	775.7 "
5.	Calvin Boyd, St. Joseph, Mo.	760.3 "

FREE FLIGHT CLASS C

1.	J. Oless, Easton, Pa.	939 Sec.
2.	S. Weckerley, Toledo, Ohio	877.5 "
3.	Joseph Pedreira, New Orleans, La.	793.3 "
4.	D. Lapworth, Detroit, Mich.	555.9 "
5.	R. W. Wright, Topeka, Kan.	516.9 "

CONTROL LINE CLASS A		SPEED
1.	D. Newberger, Long Beach, Calif.	99.2 M.P.H.
2.	H. De Bolt, Williamsville, N. Y.	94.1 "
3.	J. Kitchens, Santa Ana, Calif.	91.9 "
4.	R. Kirk, Kenmore, N. Y.	91.2 "
5.	R. O'Neill, Philadelphia, Pa.	91.1 "

CONTROL LINE CLASS B		
1.	T. Trent, Knoxville, Tenn.	122.3 M.P.H.
2.	K. Storey, Pasadena, Calif.	118.9 "
3.	J. Kitchens, Santa Ana, Calif.	117.7 "
4.	D. Newberger, Long Beach, Calif.	113.3 "
5.	S. Sieminski, Cleveland, Ohio	111.1 "

CONTROL LINE CLASS C		
1.	J. Kitchens, Santa Ana, Calif.	126.9 M.P.H.
2.	D. Newberger, Long Beach, Calif.	125.6 "
3.	S. Ambler, Cleveland, Ohio	121.4 "
4.	H. Kramer, Jr., Springfield, Mass.	116 "
5.	J. Muir, Miami, Fla.	114.6 "

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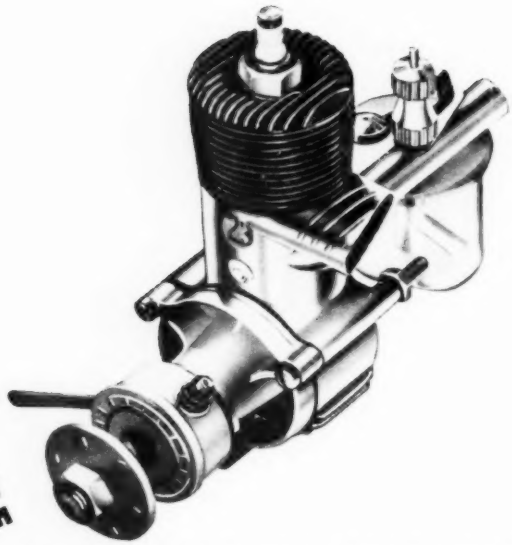

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